# THE TRADE REVIEW

## AND WESTERN MACHINIST.

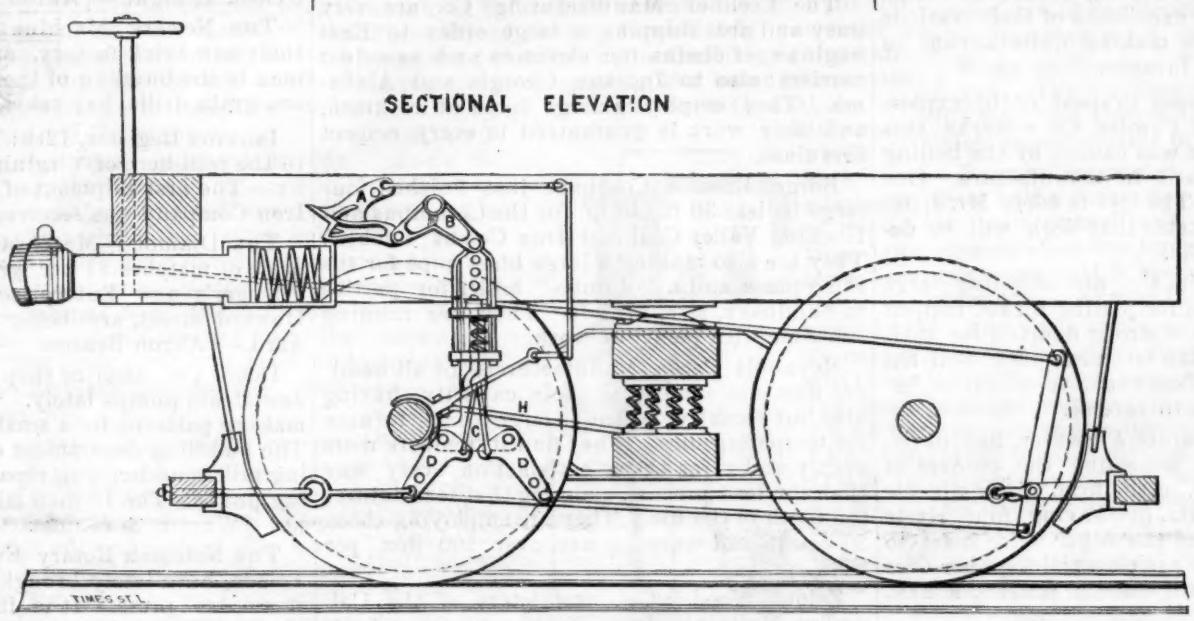
WEEKLY EDITION, Vol. XVI—No. 30. } CLEVELAND, O., JULY 28, 1883. { MONTHLY EDITION Vol. I.—No. 7.


## New Machinery.

### Automatic Freight Car Brake.

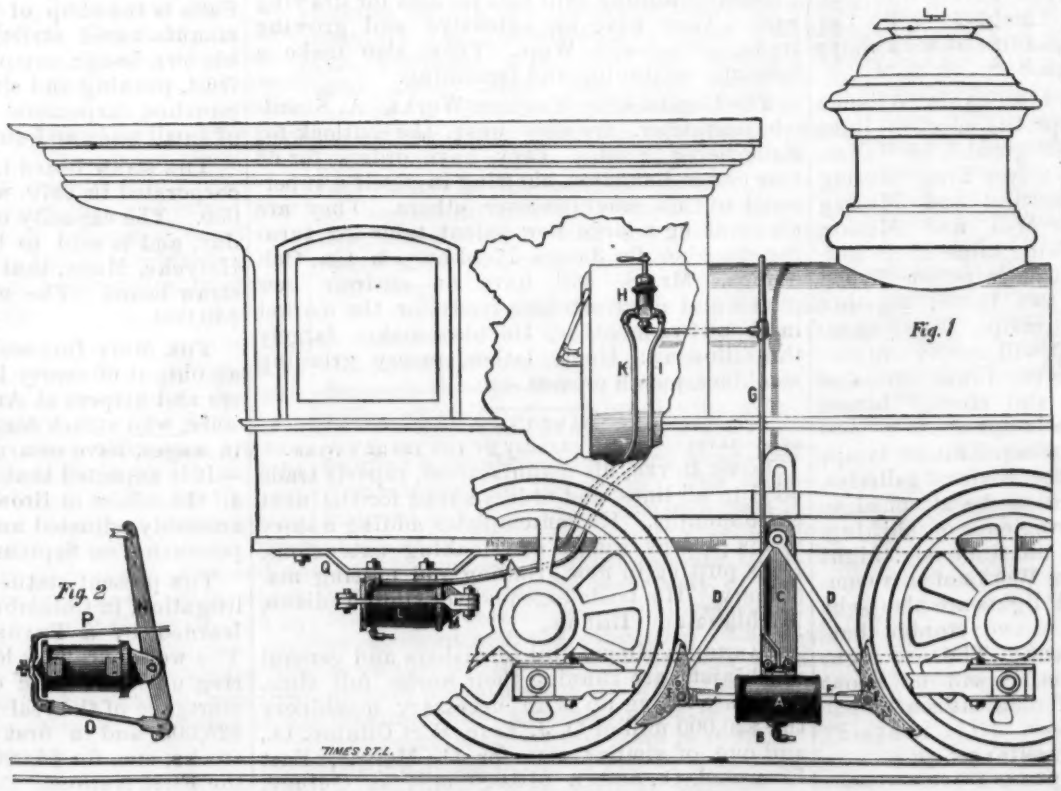
Among the most important adjuncts to the working means in the management of railroad freight trains are powerful, reliable and efficient brakes, well manned, or a system of brakes worked with or without the intervention of hand labor. The fewer train men to be relied upon for this service the less will be the danger of negligence or carelessnes, and consequently the more desirable the system. We illustrate herewith the Automatic Freight Car Brake, manufactured by the American Brake Co., of St., Louis, Mo., which requires the intervention of no hand labor, nor the personal attention of a single individual, the entire brakage of a train depending upon the reversing of his engine by the engineer. The intuitive act of the engineer in the face of danger is to reverse his engine, and this act instantly operates every brake throughout the train, with a power hitherto unknown. The main features of the means by which this is accomplished are illustrated by the accompanying cut, showing a sectional elevation of the upright automatic freight car brake as made by the above company, which receives its power from the compression of the draw-bar, and is automatically applied and released by means of the centrifugal governor on the axle.

SECTIONAL ELEVATION




AMERICAN AUTOMATIC FREIGHT CAR BRAKE.

Referring to the sectional elevation it will be seen that between the floor sills and at the inner end of the draw-bar is hung the bell crank lever (B) which carries in one of its jawed ends the push-bar (A) and in the other a double pull-rod, which holds in suitable cups a relief spring of proper dimensions, connected by a single pull-rod running through it to the mechanism below. Suspended from the draft timbers are the two hangers (CC), which carry at their lower ends the lower bell cranks (DD), and which are connected by extra bottom rods to the brake beams. By this means a direct connection is had, when required, between the push-bar (A) and the brake beams, and the relief spring prevents sliding of the wheels or injury to the brake mechanism. The purpose of the automatic part of the device is simply to lift the push-bar (A) out of connection with the draw-bar when motion ceases, and allow it to drop into connection therewith, when centrifugal force opens out the governor blocks upon the axle. As the draw-bar is drawn out, the push-bar (A) drops behind it, by its own weight and the automatic part of the device mentioned above, and the brake is then in position and ready for application. Resistance from the engine compresses the draw-bar, carrying with it the push-bar (A), thus applying the brake with a power in proportion to the compression. To release the brake, the train being still in motion, the engineer simply "pulls out," and all is free, leaving the brake ready for a similar application. The other cut represents their locomotive brake. One of the most important advantages of this brake is that it is independent of all connections, and a car equipped with it may be placed in in a train without regard to position, the brake operating with certainty when required. The introduction of foreign cars not so equipped anywhere in the train interferes in no wise with the prompt and reliable action of those which are, and a freight train fully provided with it can be as easily and readily controlled by the engineer as the passenger train with the air or vacuum brake.







AMERICAN LOCOMOTIVE BRAKE.

For further particulars address the manufacturers, The American Brake Co., St. Louis, Mo.

Send for sample copy of Trade Review, free.

### Solid and Hollow Iron Columns.

A confusion of ideas is sometimes found among practical men respecting the comparative strength of solid and hollow pillars. One hears it often said, for instance, says the Building News, that a hollow pillar is stronger than a solid one. Now this is, as one able authority has pointed out, not absolutely the case; it is perfectly true that, comparing the strengths of two pillars of the same height and diameter, one solid and the other hollow, the latter has the advantage of being economically stronger. The fact is, the solid column is stronger than the hollow of the same external diameter; but the lesser area is more effective than the greater, because the central portions of the solid pillar are less useful in resisting the bending force than the metal in the circumference of the hollow pillar. But if the quantity of material in both the solid and hollow pillar of equal height is the same, the hollow pillar is by far the stronger. A simple geometrical construction will enable anyone to understand this fact, by enabling us to proportion a hollow column of the same area as that of a solid one, by one of the diameters being given. It is shown, in fact, that hollow columns of the same area of metal as a solid one may be made to any larger diameter, their strengths increasing proportionately till a limit is reached by the shell of the metal becoming too thin to insure a sound casting. Taking an example from Downing's work, a hollow pillar 9 inches in external diameter, having an internal diameter of 8.062 inches and a thickness of metal of about 0.47 inch, or about ½ inch, is five and one-half times stronger than a solid pillar with the same quality of metal. A thickness of ½ inch is regarded as a practical limit in manufacture.

### Wire Drawing.

It was not until some tim after 1300 that wire drawing became an art. A race of wire-drawers, who made iron wire by hand, and afterwards by water power, then sprang up in Germany and became famous in Europe. Wire-making was introduced into England about the middle of the fifteenth century. This industry was commenced in the United States at the beginning of the present century, and it is needless to say that it has grown into enormous proportions within the past few years

The production of coal in Germany in 1881 is officially returned at 48,688,000 tons, as compared with 46,973,000 tons in 1880.

Subscribe for Trade Review and get Premium.

# Manufactures.

### CLEVELAND.

THE Warden Tool Co., of Cleveland, has been incorporated, with a capital stock of $15,000.

MAHER & BRAYTON are running full time and enjoying a good trade in their car wheel castings, etc.

THE Cleveland Window Glass Co. has taken the contract for resetting about 3,000 lights in the roof of the Union depot, using Ward's patent joint for the same.

ROBINSON & CROSSLEY, have just made shipments of a car load of stave and barrel machinery to California, and have a large order under way for Walnut Ridge, Ark.

BOWLER & Co. say that they are having more inquiries in the line of railroad supplies than for some time, and the prospects for the Fall trade are good, though prices are low as yet.

THE Akron Brush Light Co. have placed an order with the Brush Electric Co. for one of their 30-light dynamo machines for lighting stores and also for a number of storage batteries for lighting houses.

CIRCULARS and announcements of the Dangler Vapor Stove and Refining Co. are at hand, giving the points of excellence of their various products. They are making quite a run on their new soldering furnace.

WE omitted last week to speak of the explosion in the Hercules Powder Co.'s works, this city. The explosion was caused by the boiling over of the acid used in manufacture. One man was injured. The loss is $600. Mr. J. W. Willard, manager, states that work will be delayed about two weeks.

THE Brush Electric Co. are shipping large numbers of dynamos for plating nickel, copper, gold and silver. This strong demand for their machines is due to the fact that they will not heat when run to fullest capacity, and it is impossible for the poles to reverse.

MR. SWASEY, of Warner & Swasey, has devised a new thing for protecting the corners of large shop drawings, in the form of a malleable iron piece in two parts, one having four rivets cast on the inside and the other with holes to correspond. The two are clamped together over the corner and finished smooth, forming a neat and sure protection.

THE shops of the C., C., C. & I. road, in this city, are building a number of Mogul engines, 18x24 cylinders. They are fitted with injectors instead of pumps, and some have the extended smoke arch. The company is having four passenger cars rebuilt at the Litchfield (Ill) Car Works, and the Mattoon and Brightwood shops are building Mogul engines.

A number of mining companies in Arizona Territory are about to adopt the electric light to facilitate operations underground, as well as on the surface notably the Silver King Mining Company; the Howell Smelting and Mining Company, and the Conger Mill and Mining Company. At the Silver King mine it is proposed to use four 3,000 candle power Brush lights above ground and two below, together with 25 small incandescent lamps. The dynamo located near the main shaft will supply the current descending 800 feet to the lower levels of the mine to the arc lights and storage boxes, from which latter the Swan lamps are to be connected by small copper wires. Fixed lamps are to be suspended from the roofs of galleries, and the portable lights are to be attached to flexible conductors for convenience of shifting. These lights are to burn continuously, night and day. In the Reduction Works of this company—both large and small lights are also to be used, a separate dynamo and two storage batteries supplying the current. The arc light circuit in the Silver King mine will be about half a mile in length.—[Arizona Citizen.

—o—

### CANTON AND MASSILLON.

BY A TRAVELING CORRESPONDENT OF THE TRADE REVIEW.

THE Novelty Iron Works, Canton, P. P. Bush, proprietor, are employing 30 hands and running full time. They report business good, with orders constantly increasing in the way of general jobbing. They are at present making 50 cigar machines for W. J. Scully, Pittsburgh, Pa., and also several broom machines for Redman & Hays, of the same place.

THE Diebold Safe & Lock Co., Canton, are at present crowded with orders, as they have been for some time past. They are running full time and employ over 400 men. They are constantly enlarging to meet the growing demand for their excellent safe.

JOSEPH CORNS & SON, Massillon, have, as heretofore announced, purchased the rolling mill property in Massillon and have already started to make a number of changes. They will at once put in two new locomotive boilers, taking the place of the five large boilers that are now used. The size of the old boilers is 23 in. by 30 feet. They also contemplate putting in another large engine, and other minor changes will be made to improve the plant. They are running single turn at present, employing 115 hands.

### COLUMBUS.

BY A TRAVELING CORRESPONDENT OF THE TRADE REVIEW.

The Columbus Elbow Co. report business slack at present but are getting ready for their extensive trade for Fall. They are employing 30 hands and turning out about 200 elbows daily.

The Lechner Manufacturing Co. are very busy and are shipping a large order to East Saginaw, of chains for elevators and saw-dust carriers; also to Indiana, Georgia and Alabama. They employ a large force of workmen, and their work is guaranteed in every respect first class.

Borger Bros. & Co. have just finished four large boilers 30 ft.x40 in. for the Columbus and Hocking Valley Coal and Iron Co., at Buchtel. They are also making a large blast pipe for the same place and a "Jumbo" boiler for parties in Sandusky, size 15x5 ft. They are running full time with plenty of work.

Reynolds Bros., manufacturers of all-hand-cut files, are increasing their capacity, having also but recently added a large draft furnace for tempering files. They find it tempers more evenly and gives better satisfaction every way than the lead process, claiming that lead injures the tooth of the file. They are employing about 20 hands and turning out over 200 doz. per week.

Zelotes Wood & Co., proprietors of the Columbus Malleable Iron Works, are very busy turning out several tons of castings daily. The iron used is the best Lake Superior iron from the Peninsular Iron Co., of Detroit, Mich. Among some of their orders is one from the Cleveland Rolling Mill Co., for dies for drawing wire. They have an extensive and growing trade, principally West. They also make a specialty of tinning and japanning.

The Capital City Machine Works, A. Standish, proprieter, are very busy, the outlook for Fall being good. They have orders for 68 foot power hammers, showing in itself a superiority of this machine over others. They are also making a large new patent table leg turning machine for James Pleukharp & Co., Columbus. Mr. S. will have an entirely new punch and shear machine ready for the market in about two months. He also makes largely the following: Hand lathes, emery grinding machines, punch presses, etc.

### SANDUSKY.

BY A TRAVELING CORRESPONDENT OF THE TRADE REVIEW.

JACOB BUYER, file manufacturer, reports trade good in all lines, and orders ahead for the next three months. He contemplates adding a story to his present works and making extensions. He is putting in new grinding and cutting machinery. His trade extends over Ohio, Indiana, Michigan and Illinois.

BARNEY & KILBY, mill furnishers and general machinists, are running their works full time. They are fitting up with necessary machinery the $20,000 mill of O. J. True, Port Clinton, O., and one of similar size for C. Metsch, East Liverpool, O., and a $10,000 mill at Quincy, Mich. They are also rebuilding a large mill at Clyde, O., and have the contract for furnishing large and heavy machinery to the Licking Rolling Mill Co.'s new mill at Toledo.

TRADE is reported a little slow by J. P. Meriam, but he has recently shipped or is about to ship the following machinery: Three 10x12 engines, with boilers for Bowling Green, Ky.; a new chandling machine, with boilers, etc., for the Clough Stone Co., North Amherst, O.; a hand fire engine for Tipton, Ind.; an 8x12 engine, with boiler, for a tile mill at Vichey, O.; a 45-horse-power-boiler for the Worswick Manufacturing Co., Cleveland; a 56-inch water wheel for Big Rapids, Mich.; two planers and one shaper, with shafting and pulleys, for N. High, Ada, O., who is building a planing mill in connection with a saw mill. He has just fitted out also, a new machine shop in Newcomerstown, O., for Louis Carlharlt.

—o—

### OHIO.

ROLLING mill hands about Niles are working in the harvest fields.

THE monthly pay at Russell & Co.'s works last Saturday amounted to $25,000.—[Massillon American.

THE lately enlarged Pearl Mills, Cuyahoga Falls, have started; capacity, 125 barrels of flour every 24 hours.

THE Webster, Camp & Lane Machine Co. are so crowded with work that they find it necessary to keep a portion of their force at work until 10 o'clock at night.—[Akron Beacon.

THE Newark Machine Co. have completed their new brick factory, and are working 200 men in the building of their Victor clover hullers, grain drills, hay rakes, fanning mills, etc.

IRONTON Register, 12th: A trial is to be made in the mill here of Virginia magnetic ores for fix.—The first shipment of ore from the Rorer Iron Company was received at Etna last week.

THE Diamond Match Co. has reduced the price of matches $1 per gross.—Schumacher & Pflueger's new Enterprise Works, on North Howard street, are being pushed rapidly forward.—[Akron Beacon.

DOUGLASS' machine shop has turned out three new steam pumps lately. At present they are making patterns for a small upright engine.—The puddling department of the Westlake rolling mill is undergoing repairs, new boilers being put in. The 10-inch mill is running steadily.—[Warren Chronicle.

THE Noteman Rotary Engine and Pump Co., Toledo, have lately brought out a new portable steam drill press. It is intended to take the place of the hand ratchet, weighs but 60 pounds, and is driven by a miniature of the Noteman rotary engine, illustrated some time since by the TRADE REVIEW.

ONE of the growing industries of Newton Falls is the shop of E. T. Hewitt, where are manufactured strictly hand-forged cutlery of his own design, comprising butcher, steak, bread, fruit, pruning and shoe knives, also cold chisels, punches, carpenters' bench dogs and all kinds of small tools and cutlery.

THE straw board industry of Piqua was incorporated in 1879, with a capital stock of $200,000. The capacity of the works is 16 tons per day, and is said to be the only mill West of Holyoke, Mass., that manufactures pulp-lined straw board. The machinery alone cost over $80,000.

THE Mary furnace at Lowellville is making an output of nearly 100 tons per day.—The fillers and helpers at Andrews & Hitchcock's furnace, who struck for an increase of 10 per cent in wages, have returned to work at the old price.—It is expected that during the coming month all the affairs of Brown, Bonnell & Co. will be amicably adjusted and the new company take possession on September 1.

THE present status of the Vulcan Iron Works litigation, in Columbus, is about as follows, as learned by a TRADE REVIEW representative: The works are now leased to Alexander H. Rarring until the time of sale. There is a first mortgage of the real estate to the amount of $25,000 and a first mortgage on machinery, stocks, etc., for $8,000 held by President Ide, of the First National Bank of Columbus, not personally but for the bank. The real estate, stock, machinery, etc., are appraised at $60,000, but some machinery and stock are old and going to waste very rapidly. They have several machines made by them that cost over $700, which ma-

[Continued on Page 12.]

## Recent Ohio Patents.

MR. SILVIO E. MASSARI, of Columbus, has patented a very simple vegetable slicer. Near one end, a screw enters the vegetable to be sliced, which causes the knife, as it is revolved, to follow up the cut in a spiral and continuous manner.

A SAW-HANDLE by John Class, Canton, consists of the combination of a suitable stretcher-rod or nut with a rivet which is to be passed through both the saw and the nut, which rivet has one of its ends enlarged in such a manner that it cannot become detached from the nut.

MR. JAMES BARRETT, of Bealsville, has obtained a patent for a car coupling which is an improvement upon a patent granted to same inventor June 20, 1882. This invention consists in the employment of a coupling pin pivoted in the upper forward end of the drawhead and inclining downward and backward into the throat of the drawhead, the pin being suitably notched for engaging with the connecting link.

IN a portable forge invented by Jno. P. Holt, Cleveland, the combination exists, with an actuated-lever provided with a segmental gear, and a tension-arm provided with a like gear, the said lever and arm being of unequal length from their pivotal point, and the gears of unequal diameter, and adapted to intergear, of a driving-strap adapted to embrace the shaft of the bandwheel, and having its respective ends secured to the lever and the arm.

A CAR coupling has been patented by Mr. Charles A. Huth, of Maynard. The coupling pin is operated by a chain connected to a drum which is made fast to a shaft, the latter being operated by a crank. A spring rod fits into a notch in the drum, which supports the pin upright. When the bumper from the approaching car strikes the bumper of the car carrying the coupling pin, the spring rod is tripped and the pin drops into its place without any attention from the attendant.

A MACHINE for making auger blanks by rolling in place of producing them by hammering has been patented by Mr. Charles O. Tinzer, of Ashtabula. The main dies, which are secured to rolls,are provided with secondary dies which are removable from the main dies, so that others may be inserted. By this arrangement, together with peculiar clutch mechanism for operating the rolls and bringing the dies to the work, the machine is capable of fashioning rough blanks into finished ones ready for the final process of conversion into finished augers.

A POST-HOLE-DIGGING machine has been invented by Burton Crawford, Cross Roads. In grooves on a truck-mounted frame slide a frame with guiding-lugs, a curved cross-bar, to engage a supporting spring-hook, and two beveled gears, whose shafts carry the one a fly-wheel and the other a crank. One bevel-wheel has also a plain gear face to engage a rack, (pivoted on main frame and thrown into and out of gear by a cam-lever,) and both engage a bevel-gear on a sleeve journaled in the sliding frame, and having a spring-catch to enter holes in auger-shaft for its adjustment.

MR. CLEMENT E. PURDY, Wooster, has obtained a patent for an improved skate which is so constructed that it may be used as an ice and parlor skate. The skate is provided with a series of grooved rollers, over which an endless belt is passed when the skate is to be used in the parlor, to prevent injury to the floor or carpet, and also to prevent the rollers from slipping on the floor. When the skate is to be used upon the ice, a runner is securely attached to the rollers of the skate by a hook point which passes over the front roller of the skate, and by a thumb screw which fastens the runner over the hind roller. The clamps which secure the skate to the sole of the shoe are so arranged that the skate may be adjusted to fit the shoes of persons differing in size.

---

SUPPOSE we have a square tank and wish to make a round one to hold the same number of gallons, how shall we get the size? By this rule: Multiply one side of the square by 1.128, the product is the diameter of a circle of equal area.—[Mechanical Engineer.

## AN INGENIOUS DEVICE.

### Brockway's Automatic Brake and Fire Extinguisher.

The Automatic Brake and Fire Extinguisher, invented by Mr. Marcus Brockway, of Jamestown, N. Y., and referred to some time since by the TRADE REVIEW, was on exhibition at the Chicago Exposition and awakened much interest because of its novelty and the well known danger in railway traveling which it is intended to overcome. The accompanying cut presents a perspective view of the invention. (The lamp and axle are supplied merely for the present purpose of illustration.) It consists simply of two reservoirs, the lower one containing compressed air, supplied from the Westinghouse air brake apparatus, and the upper one containing chemicalized water. The air enters the lower reservoir from below through a check valve. From this lower reservoir extends a pipe into the upper one, this pipe leading to within three-quarters of an inch of its top. The large pipe leading out of the top of the upper reservoir extends to the top of the car stove. In the reservoir this pipe does not stop as it enters, but is conducted to the bottom where it is arched or scalloped to admit the ingress of water. In operation the compressed air comes up into the water reservoir through its pipe, which, as before said, extends nearly to the top. There is, of course, immediately exercised a downward pressure upon the body of the water in the cylinder, causing the latter to enter the discharge pipe through the arches at the bottom, and thence to course through the pipe into the stove where the fire is instantly extinguished. This action is brought about through a dislodgment of the ball, shown at the left of the cut. This ball is attached to a chain extending to the valve which allows the admission of the air from the lower into the upper cylinder. In case of collision the shock throws the ball from its socket seat; the chain is consequently violently pulled, opening the valve; the air immediately enters the upper reservoir, forcing out in an instant's time the entire contents of chemicalized water through the discharge pipe into the stove. The same action blows out every lamp in the car by a simple arrangement. From the top of the water reservoir extends the small pipe shown, which leads by branching to each lamp in the car. Of course when the compressed air enters the top of the upper cylinder the column of dead air in these pipes is forced out with a rush, effectually extinguishing each lamp.

Another valuable function is performed by this device. From the right of the apparatus will be seen depending a chain. This chain descends through the car bottom and ends with a ring which loosely embraces the axle. Fastened to the axle by set screws are two rings, forming a collar, within which hangs the loose ring attached to the chain. The collars are fastened at a determined distance from the end of the axle, this distance being so calculated that the moment a wheel mounts the rail the accompanying lateral movement of the axle brings one side of the collar referred to into engagement with the loose ring. The chain is consequently pulled, and by this a valve is opened, liberating the air from the pipe of the Westinghouse apparatus, and in the regular way every brake on the train is applied. This portion of the device it will be seen is operated only when the Westinghouse *automatic* brake is used. The fire extinguishing appliance is, however, operative with any air-brake. The second chain on the left is an auxiliary to the ball chain for operating the fire apparatus and also descends to the axle. It is made longer than the one operating the brake apparatus, so that a further side swing of the truck is necessary to operate it. The rapidity with which the device operates is very striking. With 65 pounds air pressure the 5 gallons of water with which the upper cylinder is charged, is thrown into the stove in 1⅝ seconds—timed by stop watch.

## Contracts and Construction.

[Under this head the TRADE REVIEW proposes to summarize various large contracts to be let within easy range of Cleveland, to the end that its advertisers, both at home and abroad, may be informed and be thus enabled to put in bids for different parts of the work in which they may be interested. If purchasing agents of railroads and of other large corporations will forward their invitations for proposals, the REVIEW will put them in shape and publish the same gratuitously. Mention the TRADE REVIEW in writing to parties for further information.]

THE new court house at Clarion, Pa., will cost $90,000.

AN Eastern capitalist is forming a company in Youngstown for the manufacture of brushes and brooms.

A MOVEMENT is on foot to erect a blast furnace at New Lisbon, but nothing definite has yet been decided upon.

THE Trustees of the Clyde (O.) Water Works invite proposals up to August 13 for furnishing materials and constructing water works—standpipe, pumping machinery, reservoir, etc.

WORK on the new Findlay (O.) College has begun. The building will have a frontage of 162 feet, four stories high, and will contain the latest improvements in college architecture.

PARTIES interested state positively that at least half a dozen new business blocks would be built immediately on Main street if that thoroughfare was improved, or if there was any guarantee that it would be during the present Summer.—[Akron Beacon.

THE plans and specifications for the proposed new Park Avenue Presbyterian Church, Meadville, Pa., have been approved by the society, and the working plans are now ready for inspection and estimation. The church will be of the Norman style of architecture. The entire size of the church will be 112x50 feet, with white oak finish inside.

THE act authorizing the building of water-works in Hamilton, O., provides that the city may issue bonds and raise money to an amount not exceeding $300,000. Now come the trustees and in their petition, sworn and filed, declare that they have already "made contracts for the purchase of real estate and construction of water-works to an amount exceeding $300,000." Are not all contracts made in excess of $300,000 illegal?—[Engineering News.

MR. DANIEL T. LAWSON, of Wellsville, O., has, it is understood, disposed of his patent for preventing boiler explosions to a New York company. This patent, it will be remembered, is the one that engaged the attention of scientific men over the entire country some time ago when he was making his tests at Munhall Farm, near Pittsburgh. The new company is composed of the following directors: Hon. H. J. Jewett, Colonel W. L. Brown, General John Newton, Hon. Milton S. Southard, Colonel Thomas Sharp, Thomas Kays and Mr. Lawson himself. In addition to a position in the directory, it is said Mr Lawson received a large sum of money.

PLANS have been filed in the New York Bureau of Buildings for the erection of the following costly buildings: Messrs. William Wicke & Co. propose to erect a building for a factory and a saw-mill on the northeast corner of First avenue and Thirty-first street, to be six stories high and to cost $175,000. James R. Smith proposes to erect ten buildings on the north side of Seventy-second street, 100 feet east of Tenth avenue, to cost $250,000. Elizabeth Meehan proposes to erect twelve buildings on the east side of Second avenue, between 110th and 111th streets, to cost $216,000. Clinton Sutphen will erect five buildings on the north side of Twentieth street, 275 feet west of Tenth avenue, to cost $60,000. John G. Heintz will erect two buildings on the south side of 127th street, 110 feet east of St. Nicholas avenue, to cost $51,000. Edwin Joyce will erect a building at No. 452 Eleventh avenue, to cost $10,000.

# THE TRADE REVIEW AND WESTERN MACHINIST.

ESTABLISHED 1867.—SIXTEENTH YEAR.

Devoted to the Manufacturing, Scientific, and Mechanical Interests of the Country.

PUBLISHED EVERY SATURDAY.

Office—Rooms 30 and 31, Board of Trade Building, 122 Water street,

CLEVELAND, OHIO.

TELEPHONE 852.

WILSON M. DAY, - - - - - - - Editor.
FRANK N. CARTER, - - - Business Manager.

SUBSCRIPTION, (POSTAGE INCLUDED), { Weekly $3.00 per Year. Monthly 1.00 per Year.

☞ Advertising Rates Furnished on Application.

Entered at the Post Office at Cleveland as second-class matter.

**To Machinists, Manufacturers and Others.**

THE publishers of the TRADE REVIEW solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinists and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own language, as all such contributions will be properly revised before sending to press.

☞ When writing to any of our advertisers, please say that you saw their advertisement in the Cleveland TRADE REVIEW.

**Northwestern Agent.**—H. M. Brownell, 410 Nicollet Ave., Minneapolis, Min.


## *THE IRON ORE SITUATION.*

That a favorable reaction has set in, in the iron ore market, no longer admits of any doubt. Orders have been coming in, during the past two weeks, not only for present but for future use; and though prices remain low, furnacemen seem to have became satisfied that the bottom has been reached, and a stiffening of values is the natural sequence. Particularly is this increased demand to be noted in the case of the higher priced Bessemer ores of the Republic Iron Co. During the past three weeks over 50,000 tons of these ores alone have, we understand, been sold, while the inquiries are increas ing steadily. Sales of other grades of ores have also been quite spirited—when compared with the dullness of the past few months—blocks of as high as 25,000 tons changing hands. These indications, with others which we may briefly mention, give color to the hope now more frequently expressed, that there will be a rise in prices before the opening of navigation next year. In the first place, there was not as large a surplus held over from last year as many have supposed. A large amount of the ore on dock was held for the convenience of purchasers, and not by the mine owners. Again, the product of the Lake Superior mines will be, it is stated, 1,000,000 tons short of that of last year—in other words, production will be cut off more than one-third. Finally, the number of furnaces out of blast gives reason to expect that their enforced idleness will ere long be followed by blowing in, as a consequence of which the orders for ore will come forward with still greater rapidity. As an instance of the present condition of the blast furnaces of this region, we learn that of the five furnaces of the Columbus and Hocking Valley Coal and Iron Co., only one (the Gore) is in blast. Relative to the effect which ore developments in the South may have upon the local market, a well-known iron man is authority for the statement that the hemitites can be mined as cheaply in the Lake Superior region as in Virginia and that, as between the Hocking Valley and other iron-making regions, he would far prefer a furnace in Cleveland or in North Carolina. It should be remembered, also, that in the current estimates of the cost of iron making in the South no account has been taken of the items of wear and dead labor. So far Southern iron manufacturers have been merely stripping; when they exhaust the surface supply and get down to genuine mining, with all its drawbacks, they will have occasion to revise their figures and materially increase them. The problem of iron-making in the South has only just begun to be solved.

## *THE IRON INDUSTRY OF GERMANY.*

Two important facts have been studiously or blindly omitted by Free Traders when triumphantly pointing to tables of comparison between iron-makers' wages in England and Germany—first, that the figures chosen for comparison are invariably those of Free Trade Germany of 1873-'79, and not of Protective Germany of 1879-'83; secondly, that rents in Germany are 200 per cent. lower than in England, this difference representing just that much deeper social degradation on the part of the English workman. A careful look at the actual facts in the case, such as is now being taken by Mr. Robert P. Porter for the New York *Tribune*, is helping materially to clear up the fog with which the political economists of Great Britain have enshrouded the question. As the result of an inspection of the books of several leading iron works in and around Dusseldorf, Mr. Porter has secured data "which will not only show the increase in the wages of the several departments of industry under protection, but will surprise alike free-traders in England and the United States by showing that the actual average earnings of men employed in the Bessemer works and in puddling at Dortmund, in some cases exceed the rates of wages paid for the same work in England as returned by the English Board of Trade." As to the homes of German workmen, Mr. Porter says: "The vilest hovel I have described in any of my English letters was actually renting for more than the German artisan of this district pays for a comfortable, newly built brick house, with three rooms, a kitchen and a good garden; and as for the 40-mark houses (less than 25 cents a week), such prices are unknown in the English manufacturing districts." Mr. Porter's initial table of comparison as to the wages of miners in Germany and England is well worth study, and the promised one relating to the wages of iron-workers will be looked for with much interest.

## *SPECULATION IN IRON.*

It is to be sincerely trusted that the hopes of the reorganized New York Iron and Metal Exchange may not be realized. Itself the result of a compromise between the conservative iron dealers and the lard and grain speculators of "the street," it augurs no good to either the legitimate market or those engineering the "boom." It is not pretended that the transactions or 'Change represent any actual deliveries of iron or other metals, nor is there any effort to show that the wants of manufacturers will in any degree be subserved by the new departure. It is simply an organized bet on the mar ket. That the new Exchange has come to stay, if possible, is evident from the fact that it has $65,000 in bank and and that its membership fee has already advanced $25. Its members freely avow that their purpose is to make iron, tin, copper, spelter and other metals the mere bagatelle of their dealings in futures, just the same as grain, cotton, petroleum and provisions are tossed about now. They expect to duplicate in America the speculative practice for some time past in vogue in Scotland, but they forget that the conditions here are entirely different. We have no exact methods of classification, no storing in warehouses, no "warrants," no export trade. Under the stimulus of speculation, transactions in New York one day recently reached $60,000 in iron and $85,000 in tin. The effect of such movements cannot but produce an unhealthful tone upon the market. The laws of supply and demand are ignored; what should be the most conservative of markets becomes at once the most unreliable, and all of the conditions of a panic are fostered rather than neutralized. We earnestly wish the new Metal Exchange the worst possible luck.

## *CHEAP IRON IN CANADA.*

Canada is just now making a strong effort to obtain a foot-hold as an ore mining and iron-producing region. English capital has been embarked in the fortunes of the Ottawa Iron and Steel Manufacturing Co., Limited; ore territory has been prospected; a ten-acre site has been purchased about two miles from Ottawa, and 179 square miles of virgin forest have been secured for charcoal-making. Experts have reported favorably upon the various properties of the company, and it is to be presumed that the investers are highly elated at the prospect before them. It is calculated that the central portion alone of their mineral land contains not less than 6,000,000 tons of workable ore, which can, it is asserted, be turned into pig iron at a cost of less than $14 per ton. The proposed site for the furnace is six miles from the ore beds and 18 from the part of the forest where the timber will be first cut, and it is the intention to connect them with a railroad. This, added to the water front and the already existing railroad facilities, would seem to put the new enterprise under the conditions necessary to success, if the ore is what it is claimed to be. It is to be hoped that this may not prove a repetition of the "American Scotch" experiment at Port Washington, O., so disastrous to English capital.

THE telegraphers' strike has now been on over ten days, with no signs of yielding on either side. It would be a misstatement of a very palpable fact to say that business has during this time proceeded satisfactorily to the public. While the Western Union Company has evidently put forth every effort to handle the business offered, the public has by this time discovered pretty generally that the service has been in many instances unreliable and unsatisfactory. Because of this annoyance and delay, the question has been raised from one merely of wages and grievances to one of public moment. Already litigation has been commenced in the Massachusetts Supreme Court to compel the company to show cause why it should not pay damages for failure to transact its ordinary business. What the end will be nobody can tell at this writing.

IT is with pleasure that we learn of the success of the first test of Pennsylvania's Voluntary Trade Tribunal. The long delay of the arbitrators in arriving at a conclusion and the subsequent refusal of certain mines to be governed by the umpire's decision has been followed by the acquiescence of these recalcitiants in the award, and nearly if not quite all the mines in the Pittsburgh region are now working at the advance, 3¼ cents per bushel. Meantime trade is said to have fallen off this season one-

fourth to one-half from that of last—a state of affairs which has been the Hocking Valley's gain, since she is now gobbing the lion's share of the lake trade.

ENGLAND'S shipments of railroad iron and steel of all sorts to the United States in the first six months of this year show a remarkable declension. In the first half of 1881 they were 159,309 tons; 1882, 123,442 tons; 1883, 34,425 tons—a falling off this year of 75 per cent.! It is indeed a "collapse in the American demand," as the London *Iron Trade Exchange* terms it. Notwithstanding the collapse, however, the aggregate exports of these manufactures this year from England are 10 per cent. heavier than last year, being 507,069 tons in 1883, to 460,640 tons in 1882 and 389,590 tons in 1881. America withdrawing, India is now the mainstay of Great Britain's iron and steel trade.

COMPRESSED lime as an agent in blasting coal has been known in England for some little time, but only recently has it been introduced into America. The first test of the kind in this country was made July 18 in the Eureka No. 2 mine of Berwin, White & Co., near Houtzdale, Pa., being witnessed by a number of mine superintendents. The test was not altogether satisfactory on account of the soft and spongy nature of the coal, but enough was shown to demonstrate that the new material can be successfully used in other regions. Many predict that it will ultimately supplant powder.

A NEW process of refining cast iron has lately been invented in England. After coming from the furnace, the grey cast iron is run into a sheet-metal converter divided into three compartments, and subjected to the action of an air-current at low pressure, by means of which the silicium and other admixtures are oxydized, the waste gases escape, and the molten metal becomes a pure white cast iron.

HAPPILY, the breeze in the American Society of Mechanical Engineers concerning Professor Thurston's paper on "Water Hammer in Steam Pipes" has blown over. Prof. Emery writes a very manly note to the *American Engineer* withdrawing his hasty expressions, and nothing is left now but to forget the whole affair.

THE *American Artisan* pronounces the stove trade in a promising condition. With an increase in population of the country during the past year of nearly a quarter of a million families, and stocks in the hands of retail dealers averaging less than last year, the outlook is certainly not discouraging.

AN Engineering and Metal Exhibition has just been brought to a successful close in London. This country might profitably copy after it—next year.

### Heavy Iron Failure at Niles.

Eliza Ward, doing business as the Ward Iron Co., at Niles and New Philadelphia, made an assignment Thursday. The works at Niles are owned by Cleveland, Brown & Co., of Cleveland, while the machinery and stock are owned by the Ward Iron Co. The company has not yet come into possession of the land at New Philadelphia. The liabilities are estimated at half a million; assets small. By the stopping of the mills 300 men are thrown out of employment at Niles and 200 at New Philadelphia. Mrs. Ward is the wife of James Ward, who failed ten years ago for over $1,300,000, the creditors realizing substantially nothing. Following Thursday's assignment came the assignment of A. G. Bentley & Co., bankers, and Church & McFarland, who have been handling the Ward Iron Co.'s orders. L. B. Ward & Co. are not affected by the failure.

## Practical Mechanics.

### Economy in Installation and Operation of Power and Machinery.

BY JULIUS L. HORNIG, JERSEY CITY, N. J. *

The question of economy in the construction of steam engines or motors has been discussed with great ability and science, so that the importance of the subject is generally appreciated and a selection is made from the most approved constructions. The economy by suitable adaptation and installation is a question which requires the same attention.

This article is intended to treat, in general, of the propriety of subdivision in installation where varying service is required. Such cases arise in central stations for supply of power, water, light, etc., or in manufactories, where a number of tools or machines are consuming power at varying demand. The object of the writer is to lead to further discussion and elaboration.

The generators of steam, for power under varying demand, will show higher economy by suitable subdivision. The fact that the highest economy in steam generation takes place, when the most perfect combustion takes place, indicates that the temperature of the fire should be kept nearest to this point. Therefore, a variation in the quantity of steam required demands that a variation in grate surface should take place, or, in other words, that more or fewer boilers should be operated accordingly.

The question of combination of smaller and larger boilers is worthy of investigation; and, also, the subject of loss of heat from boilers while the fire is banked, in comparison with the loss of heat from boilers at low temperature of fuel and losses consequent to that.

Steam engines, built for certain maximum capacity, will naturally show at full service the highest economy. Their loss by friction, inclusive of connections or transmissions to do work at a fixed speed, will be found essentially the same from minimum of work to their full capacity.

When work varies much, as, for instance, in the supply of light, this investigation proves important.

The attached economy-curves are worked out approximately from several systems of indicator-cards, and furnish the following:

COMPARISON TABLE OF USEFUL PERCENTAGE UP TO FULL CAPACITY.

| WORK-DIVISIONS. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|---|---|---|
| Per cent. for large machine.. | 35 | 55 | 66 | 75 | 80 | 86 | 92 | 95 | 98 | 100 |
| Per cent. for small machine. | 55 | 75 | 86 | 95 | 100 | | | | | |
| Per cent. difference..... | 20 | 20 | 20 | 20 | 20 | | | | | |

The small machine, which has only half the capacity of the large one, doing the same work as the large machine, shows a gain of 20 per cent. if used instead of the large machine when the latter is worked only to half of its capacity.

To consider the loss, a few comparisons only may serve here. In assuming a number of the same class and size of machines installed, and referring to the curve of large machine, the per cent. of loss will be found:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Working | 2 | machines, | ½ | capacity, | in place of | 1 full | = 20. |
| " | 3 | " | ⅔ | " | " | 2 " | = 10. |
| " | 4 | " | ¾ | " | " | 3 " | = 7. |
| " | 5 | " | 4-5 | " | " | 4 " | = 5. |

The curve shows a loss of:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 20 | per cent. | for | using | a machine | only | ⅓ | capacity. |
| 34 | " | " | " | " | " | 3-10 | " |
| 54 | " | " | " | " | " | 3-20 | " |

The combination of working machines of different capacity must be, evidently, advantageous, when using the smaller only for work up to its full capacity, laying the smaller up during the intermediate higher range, and add its service only at demand of rate above capacity of larger machine.

This combining of machines to keep their service nearest to their full capacity must secure the highest economy.

The rate of friction in steam engine and transmission in other installations will not vary much from electric light machinery taken here as sample and therefore a similar importance must exist.

This question of economy will apply to the installation of a number of pumps driven by a number of engines, where the service varies at times; also to a series of tools or machines operated under varying demand at factories.

The Holly Water Works Co. carry out a combination of several steam engines operating one main shaft and make steam connection to their cylinders, so that some or all may be used for high pressure, or some as second expansion cylinders, as demand may require. This should meet the requirement of subdivision in installation for economical service very effectively.

In first installations frequently the engines are adopted largely in excess of present service required, as a provision for future extensions, whereby losses are caused in the meantime by increased friction, by the necessity of carrying low steam pressure and by irregularity in motion due to injudicious expansion.

In transportation service the timely addition of the so-called hill-horse for vehicles and the pusher for railroad trains, at the steeper parts of the roads, is an established mode of working motors to nearest steady full capacity.

The auxiliary boilers and engines are found in large works for similar assistance.

From boiler tests on best constructed boilers it is to be assumed, that the highest economy is reached by consuming 9½ pounds of anthracite egg coal per hour per square foot of grate, producing 3¼ horse-power. This would give the ratio for best subdivision of boilers to suit a subdivision of engines in installation.

* Prepared for the Cleveland meeting of the American Society of Mechanical Engineers, but not read.

### The Condition in Which Carbon Exists in Steel.

Interest in the following article from an exchange will be increased by reason of the paper on the same subject recently read before the Civil Engineers' Club of Cleveland by Prof. N. B. Wood and published (with illustrations) in the TRADE REVIEW:

Two series of experiments have been made recently by Sir F. A. Abel and W. H. Deering, the results of which have just been published. In the first series, disks of steel 2.5 inches in diameter and 0.01 inch thick were employed. They were all cut from the same strip of metal, but some were "cold-rolled," some "annealed," and some "hardened." The total carbon was found to be, "cold-rolled," 1.108 per cent.; hardened, 1.128 per cent.; and annealed, 0.924 and 0.860 per cent. Some of the disks were submitted to the action of an oxidizing solution consisting of a cold saturated solution of potassium bichromate with 5 per cent. by volume of pure concentrated sulphuric acid. In all cases, a blackish magnetic residue was left undissolved. These residues, calculated upon 100 parts of the disks employed, had the following compositions: "Cold-rolled" carbon, 1.039 per cent.; iron, 5.871. Annealed, carbon, 0.83 per cent.; iron, 4.74 per cent. Hardened, carbon, 0.178 per cent.; iron, 0.70 per cent. So that by treatment with chromic acid in the cold, nearly the whole of the carbon remains undissolved with the cold-rolled and annealed disks, but only about one-sixth of the total carbon is left undissolved in the case of the hardened disk. The authors then gave a *resume* of previous work on the subject. In the second part, they have investigated the action of bichromate solutions of various strengths on thin sheet steel, about 0.008 inch thick, which was cold-rolled, and contained—Carbon, 1.144 per cent.; silica, 0.166 per cent.; manganese, 0.104 per cent. Four solutions were used. The first contained about 10 per cent. of bichromate, and 9 per cent. of sulphuric acid by weight; the second was eight-tenths as strong, the third about half as strong, the fourth about one and a half times as strong. In all cases, the amount of solution employed was considerably in excess of the amount required to dissolve the steel used. A residue was obtained as before. With solution 1, the residue contained, carbon, 1.021; solution 2, carbon, 0.969; solution 3, carbon, 1.049 (the atomic ratio of iron to carbon was iron, 2.694: carbon, 1; iron, 2.65: carbon, 1; iron, 2.867: carbon, 1); solution 4, carbon, 0.266 per 100 of steel. The authors conclude that the carbon in cold-rolled steel exists not simply diffused mechanically through the mass of steel, but in the form of an iron carbide, $Fe_3C$, a definite product, capable of resisting the action of an oxidizing solution (if the latter is not too strong), which exerts a rapid solvent action upon the iron through which the carbide is distributed.

## OUR NEGLECTED INDUSTRIES.

### The Position of Congress on the Tinned Plate Question.

The TRADE REVIEW is in receipt of the following communication from Mr. W. C. Cronemeyer, Secretary of the American Tinned Plate Association:

Does there exist another article which is in such universal use in this country as the so called tin-ware? Hardly! And yet there is certainly no other article the composition of which is so little known by those who use it.

Since the tin-plate tariff question is being prominently discussed, we hear surprisingly frequent remarks the inquiry: "Are not tin vessels made of tin, and what are tin-plates made of?" The inquirer is generally very much astonished to hear that tin-plates are made of iron or steel, and that they only contain from 2 to 6 per cent. of tin in the shape of a thin coating.

The want of knowledge in this regard has cost this country the loss of hundreds of millions of dollars.

The process of coating iron plates with tin was first invented in Bohemia or Silesia, in the forepart of the 17th century; but, like everything else in those times, the process was very crude. The iron plates at that time were produced by hammering, and of course varied much in thickness, and seldom exceeded 6in.x 8in. in width and length; these plates were heated, dipped in water, mixed with wood ash, then polished by scrubbing them with sand by hand, covered with a greasy substance and dipped into molten tin; on account of the uneven surface of the iron plates a heavy coating of tin—from 15 to 20 lbs. per 100 lbs. of iron—was necessary to produce a bright appearance. The plates that were made in those times were very costly, and were mostly worked into cuirass for warriors, ornaments for church steeples, and occasionally into vessels for family use; but the latter were so expensive that a piece would be kept as a valuable inheritance by several generations.

Such plates were used in England to considerable extent, but it had to import them, because all experiments to produce them cheap enough at home remained unsuccessful until about A. D. 1740 or 1750, when a heavy import duty was levied upon the imported article, and from that time on the tin-plating industry began to prosper in England. The process of reducing iron into thin sheets of more uniform thickness was soon afterwards invented and gradually under the system of protection, England got control of all the the markets of the world in this commodity.

Yet the consumption was comparatively small until the United States, also under a system of protection, commenced to require immense amounts of this commodity to furnish the industrial laboring classes with suitable vessels for kitchen and household vessels, as also for the preserving of meats, vegetables and fruits, and for dairy purposes.

The tin-plate industry has gained enormous proportions in England, and her best customer is the United States, we taking over two-thirds of her product. However, the manufacturers there had to struggle hard for an existence, and those who attempted to make tin-plates in England about 200 years ago had to go through similar trials and tribulations as those who have in latter years made the attempt in this country.

The tin-plate industry in this country was deprived of its intended protection by an unfortunate misunderstanding, or, as we stated before, by the ignorance of treasury officials regarding the substance of this article. The tariff laws enacted in 1864 contained a clause which demanded that tin-plates, and iron coated with other metals, should pay 2½c. per pound, but Mr. Fessenden, then Secretary of the Treasury, evidently under the impression that the so-called tin-plates were plates of tin, decided that ordinary tin-plates should come in under the duty of tin in sheets or plates. There being no tin ore found in this country, block tin was admitted to come in free, and a duty of 15 per cent. was deemed sufficient on the tin rolled into sheets. The decision of Mr. Fessenden has had the effect that American consumers must pay about thirty million dollars per annum for an article which, if properly protected, could be made in this country as well as other products of iron and steel.

Experiments have been made at various times to introduce the manufacture of tinned plates under existing tariff rates, but while it was proved beyond a doubt that this country possesses the facilities to bring forth the best kind of products in this line, it was also proved that capital could not find its due reward as long as the old established foreign manufacturers, who got rich by the high prices they were paid before an attempt at production was made in this country, had the power to sell at reduced prices for a period long enough to kill the young aspiring industry. And it was further proved that the workmen engaged in this industry could not be paid the ruling price which their fellow workmen received in other closely related but better protected industries. It was an anomaly created by an unjust and inequitable law.

In our republic the first principle on which our laws must be based should be equity.

The only possible way to manufacture tinned plates in this country without loss to the investor is to obtain labor much below the prices which rule at present in other iron mills, and this cannot possibly be obtained unless the prices in all mills are reduced; and it is not likely that the latter will be reduced any more than what any reductions from the present tariff rate make necessary, but, on the other side, wages must be reduced just exactly in proportion to the reductions that have taken or may take place in the tariff rates on the respective imported goods. The workmen may in such case insist on the old rates, but capital will be quickly withdrawn from manufacturing enterprises if the same turn out to be risky and unprofitable. In case all the rates on manufactures of iron would be reduced to the tin-plate level, a bitter fight would ensue between capital and labor, in which eventually labor would have to succumb, though many manufacturers would be driven to the wall also.

Eventually the price of labor here would be reduced to near the level of European countries, and then all the inducements to emigrate to this country would be taken away from the thrifty mechanic and farmer, and none but the scum and outcasts and assisted paupers of foreign nations would seek our shores. Our western plains would remain uncultivated, and many now thriving western towns would fall back into decay.

Under a system of protection our iron, steel, glass, cotton, wool and agricultural industries have grown to immense proportions, and by means of the protected industries the fertile soil of our Western States has been quickly developed.

Under a free trade system our workmen would not have been able to earn better wages than in the old countries, and very few of them would ever have been able to rise beyond the sphere of the poor and uneducated classes; with free trade the same spirit of caste that exists in most European countries would exist here. The connecting link between aristocracy and the working class would be broken. Break down protection and you break the ladder that enables the humble to rise out of their low sphere. If ever the conflict between capital and labor (sometimes called the social question) is to be settled it will first be settled in this country, but it can only be settled here if the laboring classes are enabled to obtain better education by means of better wages. Any unbiased person who has been amongst the laboring classes in England, Ireland, Hungary or China, and has compared them with American workmen, will readily admit the force of our argument.

It is not capital so much that needs protection, for it would eventually get the upper hand again and rule positively, not perhaps in the hands of those that hold it now, but it would accumulate in greedy and unscrupulous hands, and with labor trodden down by low wages capital would centralize in fewer and fewer hands, and ere long this country would arrive at the point where poor Ireland is now.

It certainly has been demonstrated that protection has been a blessing to our country, why then should not all industries be protected alike?

The tin-plate industry and a few others (cot ton ties, taggers iron-wire rods,) have been singled out to remain unprotected, one would almost think providentially to hold out to the people the dark spectre of "a tariff for revenue only."

Some really wonderful machines have been invented in this country recently, by which these tinned plates could eventually be produced in England by the cheapest kind of cheap labor, but to demonstrate the practicability of such machine a large amount of capital is required, and capitalists shrink from investing money in enterprises that are not secured against the intrigues and pauper products of foreign competitors.

As stated before, the amount of tinned plates consumed in this country annually represents a value of about thirty million dollars. Over three hundred sheet mill roll trains would be kept fairly busy all the time, and about half a million of people would find a livelihood by means of this industry.

The people thus provided for would consume, according to a comparison between the population and consumption of the country, one-fifth the amount of wheat now exported; one-fourth the amount of corn now exported; one-tenth the amount of wool now exported, and so on of all articles we now export.

It is well known that England is making wonderful exertions to develop and cheapen the production and transportation of agricultural products of India and her other colonies, and it will not be long until the American agriculturists will feel the decline in the demand for their products severely.

In view of such facts is it not about time that the people prevail upon their representatives in Congress to aid the establishment of all such industries which will create an additional home demand for the products of the soil, and make our country in buying, as well as in selling, independent of foreign countries.

## Doing Away with Puddling.

A Youngstown News-Register reporter has been shown a sample of iron made by a new process invented by Mr. J. J. Johnson, of Columbiana. The iron had all the appearance of the best iron and is said to be the equal of Norway iron. It was made without the process of puddling, which is the result of Mr. Johnson's invention. He claims to have discovered a process, after fifteen years of careful study and experimenting, by which the puddling process through which it is necessary to put iron before it is ready for the market, is entirely done away with. Mr. Johnson has erected a heating furnace at Columbiana in which some days ago a quantity of common pig metal was heated and turned into blooms, which were then forged into different sizes and shapes of bars. One end of the bar shown the N-R. reporter was turned while hot and the other while cold. In the latter, no doubt, lies the test of the iron. Competent men after making a careful and scrutiniz ing examination pronounced the iron of excellent quality. Mr. Johnson has been offered $1,000,000, $250,000 down, by parties in Pittsburgh, in case the invention stands the severest tests upon actual trial, but he has refused the offer. If the new process proves successful, it will be the most important discovery made in the iron business for many years, as it will completely revolutionize the present method of manufacturing iron.

## Saginaw Lumber Shipments.

Shipments from East Saginaw and Bay City for June, and the six months ending with June, are reported as follows, in *thousands* of feet:

| June. | 1883. | 1882. | Increase. | P. c. |
|---|---|---|---|---|
| East Saginaw | 37,263 | 34,239 | 3,024 | 8.8 |
| Bay City | 87,792 | 74,127 | 13,665 | 18.4 |
| Total | 125,055 | 108,366 | 16,689 | 15.4 |
| Six Months. | | | | |
| Both | 357,513 | 287,795 | 69,718 | 24.2 |

There has been a good deal of complaint this year of unsatisfactory business, but it seems that there has been a very large increase in the shipments. Lower prices and not smaller sales have probably caused the complaints.

SPECIMEN copies of the TRADE REVIEW free.

## SOME CLEVELAND EXPERIMENTS.

—o—

### Steel and Cast Steel in Place of Iron and Cast Iron.

We recently published, says the Chicago Journal of Commerce, a paper read by William Parker before the British Iron and Steel Institute on the uses which were making of steel and cast steel in place of cast and wrought iron, showing that great activity prevails abroad in this direction. We also have information that perhaps a still more rapid progress is making in America, and that for a great number and variety of purposes, steel cast directly into the form in which it is to be used has found a ready application. Any one acquainted with the valuable properties of steel, and knowing the costly process of shaping it by machine tools into the desired form, will fully appreciate what a great end those who are devoting attention to this subject are working for. There were two obstacles which were necessary to overcome; the first to produce dense castings free from blow-holes and other defects; and the second, to give them the finish and smoothness of iron castings. The earlier methods of mak ing steel castings were those of Repee, who sold his patent to the Vickers, of Sheffield, England, and of Hainsworth, of Pittsburgh, under whose patents a number of establishments in this country are working. The first consists in making molds from old clay crucibles, pulverised, with an addition of twenty per cent. of black lead, baking them in a furnace, and coating them with coal-tar, the steel being poured into them while still hot. The principal objection to the Repee process and to all other molds in which carbon is used, is, that it has been impossible to make castings of soft steel. As soon as the hot metal comes into contact with molds made of such mixtures, it absorbs a portion of the carbon. The Repee castings, too, were not smooth, and required considerable grinding and chiseling, and though all such castings must be annealed before use, their surface nevertheless lacked ductility. With a view to remedying these defects, Mr. George Cowing, of Cleveland, a number of years ago made a series of experiments at the Otis and Cleveland Rolling Mill Companies steel mills, during the course of which two points of importance were brought out. It was found that the ordinary molding materials would not stand the heat of liquid steel without fluxing more or less, so that the castings produced were always heavily coated with scabs and slags, and were filled with blow-holes caused by the impossibility of allowing the gas to escape through the walls of the mold. Mr. Cowing found that the best material meeting these objections was one which contains a maximum amount of silica and an immense quantity of substances capable of causing fluxing. He uses the purest quartz or sand, roasts it, and stamps it to an almost impalpable powder; and in order to permit handling the mold, moistens it with thin glue-water to the temper of ordinary molding-sand.

Experience in nearly all the large works of the United States and ssveral of the most noted establishments of England, during the past four years, has thoroughly demonstrated that solid and smooth castings can be made in the Cowing silica molds from any grade or variety of steel. Castings have been made in these molds from Bessemer, Siemens-Martin, and crucible steel. At the Otis works in Cleveland, mild steel having but one-tenth per cent. of carbon has been cast in them into them into articles that have been bent double without annealing. Liquid steel of this character is the hottest metal known to metallurgy; and yet it apparently makes no impression on the silica molds, the castings coming out of the sand bright and so clean that no work is required on them, further than a good brushing. We understand that at the present time twenty-three of the largest steel plants in the United States are making steel under the Cowing patent, and two special plants are now going up to make castings by this method; one by Messrs. John Roach and Ryder on the Delaware, and another of which Mr. S. T. Wellman of Cleveland, is at the head, at Alliance, Ohio. Messrs. Roach & Ryder intend to use the process largely in making heavy castings to take the place of forgings, such as armor plates, shafts, cranks, etc., for vessels. At Alliance the castings are to furnish parts for the heavy works of the Morgan Engineering Company.

It will be seen, therefore, that American engineers and iron-masters have not been idle, and that they are fully awake to the difficulties of the problems presented, and are rapidly progressing toward the attainment of this important end.

### The Lathe and its Work.

The oldest machine tool known is the most valuable. It contains the germs of all others, whether rotary or reciprocating, and can be made to take the place and do the work of any one of them at a time, and all of them as desired. Its origin is lost in the mist of prehistoric times. It is as old as the loom, and was used by the oldest nations. As constructed in these times, it has reached great perfection, and is made in various special forms; there are boring and chucking lathes, turning lathes, screw cutting lathes, drilling lathes, and polishing lathes. But a screw cutting lathe with rack or friction feed, and the other ordinary appliances of a complete lathe, comprehends in its capabilities almost all the offices of the other special tools used in the machine shop.

Take a single instance of its capabilities, the production of a screw tap. The lathe will cut a piece from the steel bar; it will drill its centers and countersink them; turn the tap, whether straight or taper; cut the thread on it; score the tap, either by a cutter in the tool post while the tap is suspended on the centers of the spindles, or by means of a rotary cutter or milling tool on the spindle centers while the tap is held on temporary centers on the tool carriage. Even the top end of the tap can be squared, by similar means, for the reception of the tap wrench.

Now, all this work represents the cutting-off machine, the drilling lathe, the turning lathe the screw cutting lathe, the planer, or the mill' ing machine. And unlike many combination tools, the lathe can be made to do all this work well.

With a cheap attachment the lathe can be made to cut gears, making the teeth with practical accuracy, and the lathe itself can be used to produce the index plate that insures this accuracy. A job of planing—or surfacing—where the work will swing in the lathe, can frequently be better and quicker done on the lathe chuck than on the planer platen. The rapidity is much greater because the surface to be worked is continually under the action of the tool, instead of having more than one-third of the time wasted in the running back of the platen for the return chip.

In short, all the other machine tools, either of a rotary or reciprocating character, are simply modifications of the lathe; and with the lathe and its convenient appliances and necessary tools, the mechanic can by the exercise of his taste and skill perform almost any ordinary job in the working of metals possible on machine tools. The possession of a screw-cutting slide-rest foot lathe and a common bench vise, with their accompanying hand tools, is an excellent outfit for the amateur.—[Scientific American.

### The Steam Engine Trade.

The latest reports of the state of the steam engine trade are not encouraging; not a few prominent shops are working on a reduced force of men, and are now soliciting and turning out other work, where formerly steam engines were the only machines produced and sold.

This dullness of trade of the particular manufacturers can be accounted for by two general causes: one, the general slackness of the iron and manufacturing industries, the other the immense amount of competition which has become a feature of the steam engine business since the boom of a few years ago. At the time the boom was caused by the general good condition of trade, and of capital seeking investment in manufacturing, but especially was it encouraged by the introduction of electric light plants.

The effect of this was that the steam engine business was extended both by an increase in the number of firms engaging in the same and by extension of the work of those firms building engines at the time. The demand has, however, not kept pace with the increased production, and with the production made necessary by the capital invested in the business; the electric light installations have not progressed at the rapid rate expected at the outset, and thus it has come about that manufacturers of steam engines have been obliged to reduce prices, and manufacture as well as to take other machine work, to keep their extensive plants in full operation. Comparatively speaking, the builders of lower-priced, but substantial and good, engines are doing a better business than those turning out more refined but higher-priced engines, since economy in first cost has been assuming a greater importance.

We are prone to regard this activity of the steam engine trade as only a temporary matter, and think that a general bettering of trade, now that the tariff matter has been settled for the time being, and electric light installations are on the increase, and other reasons, too, will within a few months cause the steam engine business to assume a much livelier aspect.

On the other hand, we think that for some time to come there is sufficient capital invested in the business, and would not recommend or encourage any more being put into the same. The styles of engines, too, in the market are ample and varied enough, both in capacity, price and adaptability, to fill every demand, and the placing on the market of crude inventions of novel design is not to be encouraged at this time as a wise move either as far as the parties engaging in this scheme are concerned, or as advancing the general character of the steam engine business.—[American Engineer.

### Excelsior Fertilizer Works, Salem, Ohio.

The manufacture of Pure Premium Ground Bone by the Excelsior Fertilizer Works of Salem, Ohio, M. C. Yates, proprietor, is a comparatively new enterprise, having been commenced on a moderate scale in 1869. Up to the period of the establishment of these works, the farming science of European countries had led to an extensive application of ground bone as the best of fertilizers, but its value here had been overlooked. In early days the virgin richness of the land precluded attention to the supply of ingredients to the soil to make up for the exhaustive influence of crops. Subsequently, as the necessity of resorting to some means to maintain the exuberance of western crops became apparent, causing enquiries to spring up in all directions, the market became flooded with fertilizers from speculative parties, the great proportion of which, viewed relatively to their cost, or to their ingredients, proved disappointing. To vary the aphorism that "there is nothing like leather," we would say that as a fertilizer "there is nothing like bone." What the land that has borne many crops requires is the return of the phosphates which bone embodies to the highest degree. The sales of this concern were confined to the immediate vicinity of Salem until 1872 when the reputation of pure premium bone began to increase and spread throughout the whole country, and each year sales have doubled that of the preceding.

### The Earth more Rigid than Steel.

Professor Sir W. Thomson in his new treatise on natural philosophy is led, by a consideration of the necessary order of cooling and consolidation of the earth, to infer that the interior of our world is not, as commonly supposed, all liquid, with a thin solid crust of from 30 to 100 miles thick, but that it is on the whole more rigid than a continuous solid globe of glass of the same diameter, and probably more rigid than such a globe of steel.

A COLOSSAL steam boiler, recently built at Wiessenthal, in the Grand Duchy of Baden, is believed to be the largest in the world. It weighs 40 tons, and the builder celebrated the completion of it in a manner at once odd and becoming. He gave his workmen a lunch in its bowels. Covers were spread upon the table for 30 persons, and racks for crockery and things to eat were put along the sides. It was not with the uttermost ease that the workmen got into the dining hall, since they were obliged to slip through an opening in the top about three feet square.

# Market Review.

OFFICE OF TRADE REVIEW AND WESTERN MACHINIST.
CLEVELAND, FRIDAY EVENING, July 27, 1883.

IRON ORE.

The salient features of the ore market are set forth in an article elsewhere. Everything goes to show an improved tone to the market. Receipts the past week have been 34,387 tons against 37,738 tons last week; shipments, 20,022 tons against 13,248 tons last week. The receipts thus far this year, since the opening of navigation have been 253,047 tons. We quote:

| | |
|---|---|
| No. 1 Specular and magnetic Bessemer Ores per ton | $7.50@ 8.00 |
| No. 1 Specular (non-Bessemer) ores per ton | 6.50@ 7.00 |
| Bessemer Hematites | 5.00@ 5.25 |
| Non-Bessemer Hematites | 4.25@ 4.75 |
| Menominee Range Bessemer | 6.25@ 6.75 |
| Menominee Range non-Bessemer | 4.50@ 5.00 |

IRON.

PIG IRON.—Of the Cleveland market H. S. Mould & Co. say in their weekly circular: "The market for past two weeks has shown some slight improvement; consumers buying with more confidence, and slightly better feeling on part of holders. There has been no pronounced advance in values, but it looks healthier. Best grades of foundry iron are not any too plentiful and good softeners are in demand." Though the stocks in hands of consumers are not large, trade still continues very quiet. We hear of no furnaces intending to go into blast, and there will be none until the market improves. We quote, with some changes from last week:

CHARCOAL PIG IRON.

| | |
|---|---|
| No. 1 Lake Superior charcoal | $24.00@26.00 |
| No. 2 Lake Superior charcoal | 25.00@26.00 |
| Nos. 3 and 4 Lake Superior | 26.00@27.00 |
| Nos. 5 and 6 Lake Superior | 25.00@27.00 |
| Nos. 1, 2, 3, 4, 5, Salisbury | 35.00@37.00 |
| Southern Car Wheel | 28.00@33.00 |

BITUMINOUS AND COKE IRON.

| | |
|---|---|
| No. 1 foundry, all lake ores | $21.00@22.50 |
| No. 2 same | 20.00@21.00 |
| No. 1 foundry, lake ores, with cinder mixture | 20.50@21.50 |
| No. 2 same | 19.50@20.50 |
| No. 1 foundry, native Ohio ores | 20.00@22.00 |
| No. 2 same | 19.00@20.50 |
| No. 1 silvery, native Ohio ores | 19.00@21.00 |
| No. 2 same | 18.00@20.00 |
| No. 1 gray forge, red short | 19.00@20.00 |
| No. 1 gray forge, neutral | 18.50@19.00 |
| No. 1 Bessemer | 22.00@23.00 |

We have received the following from E. L. Harper & Co., Cincinnati:

CINCINNATI, July 18, 1883.

We take pleasure in announcing to the trade interested in Lake Superior Charcoal Pig Iron, that the Vulcan Furnace Co.'s new furnace at Newberry, Chippewa Co., Mich., has developed in its first blast most satisfactorily, producing pig iron of the choicest qualities, the practical tests of which have demonstrated that the Vulcan is inferior to none, as an entirely reliable metal in Malleable and Car Wheel work of the highest order. The exceedingly careful grading affords consumers any peculiar temper desired, and full reliance can be placed in the absolute uniformity of the irons as graded. We will be pleased to quote you prices, on application, for sample lots of the Vulcan, and we are sanguine that your test of it will be gratifying and lead to further orders. Inquiries by wire, for prices, may be send at our expense. Very truly yours, E. L. HARPER & CO.

Sole sales agents Vulcan Furnace Co.

GRADES OF VULCAN PIG IRON.

| | Chill Test. | Grade How marked. |
|---|---|---|
| No. 1 A | none | In White, A |
| " 1 B | none | " White, B |
| " 2 Soft | none | " Red, S |
| " 2 Medium | none | " Red, M |
| " 2 Hard | none | " Red, H |
| " 3 Soft | 1-16 to 4-16 | " Yellow, S |
| " 3 Medium | 4-16 to 8-16 | " Yellow, M |
| " 3 Hard | 8-16 to 12-16 | " Yellow, H |
| " 4 Soft | 12-16 to 16-16 | " Green, S |
| " 4 Soft-hard | 16-16 to 1 4-16 | " Green, I S |
| " 4 Medium | 3-8 to 7-8 Sandface | " Green, A |
| " 4 Hard | 5-8 to 7-8 Sandface | " Green, H |
| " 5 Soft | Slight Mottle | " Blue, S |
| " 5 Medium | Mottle | " Blue, M |
| " 5 Hard | White | " Blue, H |
| " 6 Soft | Soft | " Ochre, S |

CINCINNATI.

[Reported for the TRADE REVIEW by E. L. Harper & Co.]

Business has been fairly active since our last report, and the indications favor a steady increase in the volume of business, into the near future and on through the fall. The contracts to be renewed in August and September aggregate a very large amount of pig iron, and the taking up of the amount of iron required will necessarily give an impetus to business and probably lead to higher values of crude iron. Many consumers would be gratified to contract at prices obtainable, were it not for a suspicion their neighbors and competitors may be benefited by waiting, and thus many liberal orders are withheld in the hopes for advantages that may or may not be realized in the delay. Considering the season the demand for manufactured iron continues active, and prices are well sustained. We quote as the figures current:

Foundry—Hanging Rock Charcoal, No. 1, $23 75@$24 75; Hanging Rock Charcoal, No. 2, $22 75@$23 25; Strong Neutral Coke, No. 1, $20 00@$21 00; Strong Neutral Coke, No. 2, $18 50@$19 00; American Scotch, No. 1, $18 50@$19 00. Grey Forge—Neutral Coke, $17 00@$17 50; Cold Short, $16 50@$17 00. Car Wheel and Malleable—Hanging Rock Strictly Cold Blast, $28 00@$28 75; Hanging Rock Warm Blast, $24 00@$24 50; Lake Superior, 1 and 2, $25 50@$26 00; Lake Superior, 3 to 6, $26 00@$27 00; Southern Car Wheel Strictly Cold Blast, $28 00@$29 00.

[Reported for the TRADE REVIEW by Rogers, Brown & Co.]

The market presents about the same features as last week. A liberal amount of business is going, but buyers get the iron they need at prices that represent no advance. Many large consumers are endeavoring to cover their wants to the end of the year by contracts at the prevailing figures, but the furnaces almost unanimously decline such business, believing the future will be in their favor. Such offers to the extent of 6,000 to 8,000 tons have been declined within a few days at prices that would find takers for early delivery, charcoal irons are rather slow. Good softeners are in fair demand. Forge irons are firm, but not very active, owing to the suspension of all the nail mills. We revise our quotations, which are for cash:

Hot Blast Foundry.—Hanging Rock Charcoal, No. 1, $23 50@$24 50; Hanging Rock Charcoal, No. 2, $22 00@$23 50; Southern Charcoal, No. 1, $22 00@$23 50; Strong Coke, No. 1, $20 00@$21 00; Strong Coke, No. 2, $19 00@$19 50; Strong Coke, No. 3, $18 00@$18 50; Soft Stone Coal, No. 1, $20 00@$19 50; Soft Stone Coal, No. 2, $18 00@$19 00. Forge—Strong Neutral No. 1 mill, $17 50@$18 00; Cold short No. 1 mill, $16 50@$17 50. Car Wheel & Malleable—Hanging Rock Cold Blast, $31 00@$33 00; Hanging Rock Warm Blast, $25 00@$27 00; Southern Car Wheel Iron, $26 50@$27 00; Lake Superior Car Wheel Iron, $25 00@$26 00; Lake Superior Malleable Iron, $25 00@$26 00.

CHICAGO.

[Reported for the TRADE REVIEW by A. B. Meeker & Co.]

There is a generally fair demand with good inquiry for all brands. We quote:

Lake Superior Charcoal, 1 & 2, $24 00@$25 00; Lake Superior for Car Wheels, No. 3, $24 00@$25 00; Lake Superior for Car Wheels, 4 and 5, $25 00@$26 00; Scotch, according to brand, No. 1, $26 00@$27 00; Hanging Rock, Charcoal, No. 1, $24 00@$26 00; Hanging Rock Coke, No. 1, $23 00@$25 00; Anthracite, No. 1, $23 00@$25 00; Anthracite, No. 2, $22 00@$24 00; American Scotch, No. 1, $23 00@$26 00.

MANUFACTURED IRON.—Trade is very quiet. Stocks in the hands of retail dealers are not large, but whether there will be any improvement it is impossible to say.

STEEL RAILS.—The market continues very dull. There is little or no inquiry. We quote at $42 gross ton.

RAILWAY SUPPLIES.—There is little to note. The market has been very quiet the past week.

OLD RAILS.—But little demand and prices not quotable.

SCRAP.—There have been a few sales, but there is practically no market, and prices remain unchanged.

HARDWARE.

There has been no noticeable increase in activity in the week under review. Collections are not much better.

NAILS.—Stocks are very slim on leading sizes. We continue to quote at $3.00, 60 days, 2 per cent. off for cash.

MACHINERY OILS.

The market is firm in tone in animal and similar oils but unchanged in petroleum lubricants. Trade is fairly active.

COAL.

The market has been dull the past week, but the mines are all running. There has been no change in prices.

## LUMBER MARKET.

PLANK—MIXED WIDTHS, 1¼ AND 1½ INCH.

A 1 & 2..$50 00 A 3..$40 00 B..$32 00 C..$21 00 D..$14 00 E..12 00

2-IN. 12, 14 AND 16 ft., TOGETHER.

A 1 & 2..$48 00 A 3..$40 00 B..$32 00 C..$21 00 D..$14 00 E..13 00

BOARDS—1 IN. MIXED WIDTHS.

A 1 & 2..$45 00 A 3..$36 00 B..$30 00 C..$20 00 D..$15 00 E..12 00

STOCK BOARDS—12 IN.

A 1 & 2..$45 00 A 3..$36 00 B..$35 00 C..$20 00 D..$15 00 E..12 00

STRIPS—6 IN.

A 1 & 2..$42 00 A 3..$ ... B..$35 00 C..$22 00 D..$17 00 E..12 00

FLOORING, SIDING AND CEILING.

Matched flooring.....A 3, $42 00 B, $38 00 C, $24 00 D,20 00
Matched drop siding, 6 in.A 3, $42 00 B, $38 00 C, $24 00 D, 18 00
½ in. bevel siding.....A 1 & 2, $24 00 A 3, $20 00 B, 18 00
Beaded ceiling $2 higher than flooring.

BILLSTUFF.

Small joist, 12, 14 & 16 ft.$13 00 | Small timb'r, 12,14,16,18 ft 14 00
18 ft .....$13 00@$14 00 | larger than 8x8, special.
Long timber, 20 ft. and over, add about $1 per ft. to the price of short.

SHINGLES, LATH AND MILL WORK.

Shingles, XXX, 18 in.....$4 25 | S, 1 S, $1.00; S, 2 S .....$1 50
clears or clear butts..
$2 50@$3 00 | Matching, flooring and
Lath .....$2 75 | drop siding.....$2 00@$2 50

A HOLLOW seamless steel rail, for railroads, is a recent invention. It is of the same form and size as the steel rail at present in use, but is one-third lighter, and has three times the strength, ductility and resistancy of the solid rail. It can be made in the same mills as the solid rail. The tubular opening through the rail, which is about two inches in diameter, it is proposed to utilize as a conduit for telegraph wires and cables.

ALLOYS are often difficult to make. It has been found that the presence of even 1-30000 of a pound of antimony in a pound of melted lead increases the rapidity with which the lead oxidizes and burns. Lead which contains more than 1-1400 of its weight of copper is unfit for the manufacture of white lead.

### A Miniature Blast Furnace.

The Journal of the United States Association of Charcoal Iron Works gives some interesting particulars relating to a miniature blast furnace, or rather cupola, which was erected in Freedom, Sauk County, Wis., a short time since. It is an iron shell, 5 feet diameter and 21 feet high, lined with fire-brick, so as to have the following interior dimensions: Diameter at bottom, 20-inches; diameter at top of crucible, 24-inches; height of crucible, 48-inches; diameter at bosh, 40-inches; height of bosh, 9 feet from bottom; diameter of tunnel-head, 26-inches; total height, 21 feet. It was provided with two 1½-inch tuyeres placed 20-inches above the bottom. Openings were cut in the shell to accommodate the tuyeres, water tymp and gas flue, the latter being formed of fire-brick 16-inches inside diameter, extending from the hearth level to within two feet of the tunnel head, and rivaling in size the furnace stack itself. Ample boiler power and a 40-horse-power steam engine, which had done previous service at a tannery, were supplied, and at first connected with a fan-blower. This proved unsatisfactory, and a horizontal cylinder 18-inches in diameter and 22-inches stroke, which had been used to agitate beer in a brewery, was substituted with but little better results. An oven containing 14 small ox-bow hot-blast pipes was also erected. The furnace has not been a success, and no attempt to continue the experiment has been made since February, although it is reported that a stack of larger dimensions is to be erected there. During the time a fan blower was used the blast was cold—and weak. The hot-blast was added when the piston blower was procured. About ten tons of iron were cast over the dam in the aggregate, mostly in the shape of scrap. The supply of ore is entirely local and of uncertain extent.

### The New Postal Notes.

The new postal notes for the transmission of small sums of money are now being prepared by the Homer Lee Bank Note Company, in this city, says the New York Tribune. They will be ready for delivery about the first of September. The notes are in shape nearly like bank notes. They are printed in blank form, spaces being left for the names of the post-offices from which they are sent and at which they are paid. On the right-hand side of each of the notes are three columns of figures, one for the dollars, containing the figures from 1 to 4. The second for the dimes from 1 to 9, and the third for the cents from 1 to 9. The postmaster who sells one of these notes will punch the figures indicating the amount for which the note will be received. For instance, if a note for $3 52 is wanted the figures 3 in the dollars column, 5 in the dimes column and 2 in the cents column will be punched out. All counterfeiting or "raising" is thus prevented. The notes may be bought of any value from one cent to $4 99. A charge of three cents will be made in addition to the face value of the note. The great advantage possessed by the postal notes over money orders is that the former are transferable, so that it will not be necessary for those who receive them to go in person for the money. They may be used in payment of goods or for other purposes, but must be presented for payment within a few months or their collection will be more difficult.

### American Association for Advancement of Science.

The thirty-second meeting of the American Association for the Advancement of Science will be held at Minneapolis, Minn., beginning August 15th, and closing Aug. 21 next. Professor C. A. Young, of Princeton, will preside. Information regarding transportation may be obtained by addressing Thomas Lowry, Esq., Minneapolis, Minn. All matters relating to membership, the presentation of papers, and business to come before the meeting will be attended ty by F. W. Putnam, permanent secretary, who may be addressed at Salem, Mass., up to the close of the meeting, August 21, at the Nicollet House, Minneapolis, Minn.

THE Boston *Manufacturers' Gazette* adds its protest to that of the TRADE REVIEW against the lavish ornamentation of machinery. It considers "gingerbread work" the bane of modern engine-rooms.

# Cleveland Wholesale Prices.

[The lowest quotable prices are given in all cases.]

## HARDWARE.

### Adzes.

| | |
|---|---|
| Carpenter's | per doz $18 40 |
| Ship | " " 18 75 |
| Heavy railroad | " " 19 50 |

### Axes.

| | per doz. |
|---|---|
| James' 2d qual | $7 00 |
| Buckeye | 7 75 |
| " doub. bitt | 15 00 |
| Hunt's | 9 50 |
| Mami's | 8 00 |
| Lippincott's Crown | 8 50 |
| Cut More | 9 00 |
| Peck's Double Bit | 22 00 |
| "Champion Blade | 11 00 |
| Good triple silver steel | 11 50 |

### Axles.

Standard list,
Nos. 1 to 6, 50 & 10 off
Nos. 7 to 14, 50 & 5 off
Nos. 15 to 18, 45 off
Nos. 19 to 22, 50 & 5 off

### Anvils.

| | per lb. |
|---|---|
| Eagle, Amer | 10c dis 20 |
| Wright's | 11¾c@11c |
| Armitage's Mouse Hole | 9¼c@9¾c |
| Trento | 10¾c |
| Wilkinson's | 10½c |

### Anvil Vise and Drill.

Millers Falls Co. $28 ..... dis 20
Cheney Anvil and Vise dis25&2

### Augurs and Bits.

C S cut augers ..... dis 50&10
do do do bits ..... 50&10
D C gimlet do Ives .. dis 50
Snells bits ..... dis 40&10
Russell Jennings' augers, dis 10&10&10
Cook's pat augur ..... 40&10

### Animal Pokes.

| | |
|---|---|
| Akron | $ 3 50 |
| Camp's | 4 00 |
| Berea, per doz | 4 00 |
| Eagle, per doz | 5 00 |

### Apple Parers.

| | |
|---|---|
| Domestic & Reading | ₱ doz. $7 00 |
| Turn Table | 4 50 |

### Bolts.

| | |
|---|---|
| Machine | dis 70 |
| Plow | dis 50 |
| Plow, R. B. & W | dis 40 |
| Cast Iron Barrel Shutter, etc | dis 55&10 |
| Cast Iron Chain (Sargent' list) | dis 60&10 |
| Ives' Pat. Door Bolts | dis 50 |
| Wrought Barrel | dis 55&10 |
| Wrought Square | dis 55&10 |
| Wr'g't Shut'r, all iron, Stanley's list | dis 50&10 |
| Tire, R. B. & W., new list | dis 70&10 |
| Stove, American Screw Co.'s | dis 40 |
| B. B. & W | dis 40 |
| Bolt Ends 16c. per lb net | 60 |

### Bellows.

| | Dis |
|---|---|
| Bl'ksmith's com new list, 50 ₱ ct | |
| Moulder's new list, dis 25 ₱ ct | |
| Hand, new list, 25 per cent | |

### Butts.

| | Dis |
|---|---|
| Wrought brass | 70 |
| Cast, loose joint | 60&10 |
| Pin, loose | 55&10 |
| Wrought, fast joint narrow | 50&10 |
| Wrought fast joint broad | 50&10 |
| Wrought loose joint broad | 55&10 |
| Wrought table and back flaps | 50&10 |
| Loose joint, without acorns | 55&10 |

Ten per ct. extra dis for cash.

### Boiler Plates.

"Gaylord"-Standard Quality.

| | |
|---|---|
| C. No. 1 | 4 50 |
| C. H. No. 1 Sheil | 4 75 |
| C. H. No. 1, 50,000 | 5 25 |
| C. H. No. 1, 55,000 | 5 75 |
| C. H. No. 1 Flange | 6 50 |
| Firebox | |
| T. S., 60,000 (as per) | 6 50 |
| T. S., 65,000 (act of) | |
| Homo. Steel, 70,000 (of Cong) | 7 50 |

Heads, ¼c ₱ lb. extra.
N.B.-Eastern brands of boiler plate at from 2-10 to 3-10c ₱ lb less than above prices.

### Boiler Tubes.

| | |
|---|---|
| "National" Standard Gauge 1 inch to 10 inch | dis 37½ |
| "National" Standard Gauge 11 inch to 15 inch | dis 25 |
| "National" Special Locomotive Tubes | net list |

### Bag Holders.

Sprengle's Pat, $18.00 per doz
40 per cent. dis.

### Boiler Makers' Tools.

| | |
|---|---|
| Doty's Power Shears | net list |
| " Hand Lever Shears | net list |
| " Power Punch | net list |
| " Hand Punch | net list |
| Steel Screw Punch | net list |
| Iron Screw Punch | net list |
| Boiler Plate Rolls | net list |
| Buffalo Forges & Blowers | dis 20 |
| Watson's " " | net list |
| Spring Tube Expander | dis 15 |
| Roller Tube Expander | net list |
| National Tube Cleaner | dis 20 |
| Wire Flue Brushes | net list |
| Anvils—'Peter Wright' 12½ ₱ lb | |
| Solid Box Vises | net list |

### Cleveland Stamped Elbows

Genuine Russia Iron

| | | |
|---|---|---|
| 4½ inch, per doz | | 5 50 |
| 5 | do do | 7 50 |
| 6 | do do | 9 50 |
| 7 | do do | 11 00 |

### Charcoal Iron

| | | |
|---|---|---|
| 4½ inch, per doz | | 2 50 |
| 5 | do do | 3 50 |
| 6 | do do | 4 25 |
| 7 | do do | 5 50 |

### Planished Amer. Russia Iron

| | | |
|---|---|---|
| 7½ inch per doz | | 5 00 |
| 4 | do do | 6 50 |
| 5 | do do | 9 50 |
| 6 | do do | 8 05 |

Discount 33⅓ per cent

### Chisels.

| | |
|---|---|
| Hot and cold cutting | ₱ lb 30 |
| Railroad track | 30 |
| Machinists | 30 |
| Mallet head | 50 |
| Tape | 50 |
| Packing | 50 |
| Stone cutters | 50 |

### Crowbars.

| | |
|---|---|
| Cast steel | ₱ lb 7 |
| Iron, steel points | 5c |

### Cutlery, Pocket and Table.

| | |
|---|---|
| Meriden Cutlery Co., table | net |
| Am. Miller Bros.' Cutlery Co | dis 25 |
| Humason & Beckley, pocket | 33⅓ |
| Naugatuck Cutlery Co. list | net |
| Aaron Berkenshaw's pocket | dis 25 |
| Fram Cutlery Co., table | net |
| Cleveland Cutlery Co | dis 25 |
| Miller Bros., pocket | 33⅓ |
| Akron Cutlery Co | dss 45 |

### Coopers' Tools.

| | |
|---|---|
| Bradley's | dis15@20 |
| Braton's | dis15@20 |

### Chains.

Coil by cask,

| 3-16 | ¼ | 5-16 | ⅜ | 7-16 | ½ |
|---|---|---|---|---|---|
| 10½ | 9 | 8 | 7 | 6¾ | 6¼ |

### Drills and Drill Stocks.

| | |
|---|---|
| Blacksmiths', each | $2.50 dis 10 |
| Blacksmiths', self-feeding, each | 7.50 dis 20 |
| Breast, P. S. & W | dis 20&10 |

### Drawing Knives.

| | |
|---|---|
| Peck, Stow & Wilcox | dis 70 |
| Witherby's | dis 65@10 |
| Nobles Mfgr. Co | 15 |
| Adjustable handle | 20 |

### Emery and Sand Paper.

| | |
|---|---|
| Regular Numbers | ₱ lb 6c |
| Flour and F. F | ₱ lb 4c |
| B. & A. Emery Paper | dis 35 |
| Sand paper | dis 35 |

### Enameled & Tinned Ware.

| | |
|---|---|
| Kettles | dis 50 |
| Sauce Pans | dis 30 |
| Tinned Sauce Pans | dis 30 |

### Files.

| | |
|---|---|
| Parkin's $5 to £ | dis 45 ₱ cent |
| E.M. Boynton's, new list | dis 25 |
| J. & Riley Carr | 4.50 to £. |
| Johnson & Bro. | dis 50 |
| Butcher's | 4.50 to £. |
| Walter Spencer & Co.'s "Diamond" | 4.50 to £. |
| Fisher's | 4.50 to £. |
| Moss & Gamble | 4.75 to £. |
| H. Disston & Sons (new list) | 4.50 to £. |
| Heller Bros.' Horse Rasps | dis 45 per cent |
| Nicholson | dis 35 |
| New American | dis 45 |
| Union File Co | dis 45 |

### Grindstones.

| | |
|---|---|
| Berea | 1@1½ ₱ lb |
| Ohio | 1¼@1⅝ ₱ lb |
| Nova Scotia | 1¾@1⅞ ₱ lb |
| Lake Huron | 1@1⅜ ₱ lb |

### Hammers.

| | |
|---|---|
| Maydole's | dis 15 |
| Cheney's | dis 25 |
| Hartford Hammer Co | dis 20 |
| Humason & Beckley | dis 50 |
| Verree | dis 5 |
| Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50 and $1.75, dis | 25&10 |
| Nelson Tool Works | dis 40&10 |
| Warner & Noble's | dis 5 |
| Kip's | dis 15 |

### Hatchets.

| | |
|---|---|
| Buckeye | Shingling, |
| Nos. 1, 2, 3, | |
| ₱ doz $7 50, $8 00, $8 50, dis | 40 |

### Claw,

| | |
|---|---|
| Nos. 1, 2, 3, | |
| ₱ doz $8 25, $8 75, $9 25, dis | 40 |

### Lathing,

| | |
|---|---|
| Nos. 1, 2, 3, | |
| ₱ doz $7 50, $8 00, $8 50, dis | 40 |

### Hinges.

| | |
|---|---|
| Champion double acting spring hinges | dis. 30 |
| Screw & Strap 8@12 in. | $5. net |
| Gravity Locking Blind Hinges, Sargeant & Co. | 70&10 |
| Clark & Co | 70&10 |

### Locks.

| | |
|---|---|
| Whipp e Mfg Co | 50 & 5 |
| Norwalk Lo Co | 45&10&10 |

### Nails.

| | |
|---|---|
| 20 to 60d | $3 00 |
| 8 and 9d | 25 |
| 6 and 7d | 50 |
| 4 and 5d | 75 |
| 3d | 1 50 |
| 2d | 2 75 |
| 3d fine | 3 00 |
| 2d fine | 3 75 |
| ⅝ inch | 3 00 |
| 4d barrel | 1 00 |
| 1¼ inch barrel nails | 1 50 |
| 1¼ do do do | 1 75 |
| 1 do do do | 2 50 |
| ⅞ do do do | 3 00 |
| Cut spikes, all sizes | 35 |
| Clinch nails, all sizes | 1 75 |
| Casing and box nails | 75 |
| Finishing nails, | $1 25 |
| Tobacco nails, | 50 |

### Nuts and Washers

| | |
|---|---|
| Nuts, square | 8c off list. |
| Nuts, hexagon | 9c. off list. |
| Washers | 7c off list. |

### Nuts, Bolts, etc.

| | |
|---|---|
| Machine Bolts | dis 70 |
| Bolt Ends | dis 70 |
| Boiler Patch Bolts | net list |

### Picks.

| | |
|---|---|
| Railroad, 4 to 5 lbs | doz $6 60 |
| 5 to 6 lbs | 7 20 |
| to 7 lbs | 7 80 |
| 7 to 8 lbs | 8 40 |
| Railroad Tamping Pick 7 to 8 lbs | doz 10 80 |
| Mill Picks per lb | 75c |

### Planes.

| | |
|---|---|
| Ohio Tool Co | dis 20 |
| Sciota | dis 25 |
| Bailey's Pat. Adjstbledis | 20@10 |
| Sandusky, fancy | dis 15 |
| Buckeye | dis 20 |
| Ogontz | dis 25 |

### Rivets.

| | |
|---|---|
| on | dis 40 |
| inned | dis 40 |
| opper | dis 50 |

### Rules.

| | |
|---|---|
| Stanley | dis. 70 & 10 |

### Squares.

| | D. s |
|---|---|
| Steel or iron, case lots | 50 |
| Try squares and T bevels | 40 |

### Spikes—WROUGHT

| | |
|---|---|
| All lengths by ¼ inch | 4½c |
| do do do 5-16 | 3½ |
| do do do ⅜, 7-16 & ½ in | 3¼ |

### Shovels and Spades.

| | |
|---|---|
| Ames' new list, July 1, 1881, | dis 15 |
| Old Colony | dis 15 |
| Remington's (Lowman's Patent) | dis 30 |
| Bishop | dis 50 |
| Chisholm | dis 25@30 |
| Rowland's | dis 50 |
| Griffiths | dis 50 |

### Sad Irons.

| | |
|---|---|
| From 4 to 10 lbs | per lb 3 net |
| Self-Heating | ₱ doz $9 net |
| " Tailors | ₱ doz $18 net |
| Gleason's Shield and Toilet | dis 25 |
| Mrs. Pott's Irons, double pointed | dis 35 |
| M rs. Pott's Irons, square back | dis 35 |
| Enterprise Star Irons | dis 35 |
| Combined Fluter and Sad Iron | ₱ doz $15, dis 15 |

### Saws.

| | |
|---|---|
| Disston | dis 20 |
| Disston's Circular | dis 40 |
| Disston's hand panel, rip, &c | dis 20 |
| Boynton's lightning cross cut new list | dis 40 |
| Boynton's circular and mill | dis 40 |
| Boynton's ice | dis 25 |
| Boynton's lightning hand panel and rip | dis 25 |
| Livingston's butcher and kitchen | dis 20 |
| Livington's framed wood Nos. 101 102 103 104 105 doz $10 8 50 10 7.50 6.20 | net |
| Peace circular & mill | dis 40 |
| Peace hand panel and rip | dis 25 |
| Peace band saws, all widths | dis 10 |

### Scales.

| | |
|---|---|
| Hatch, Counter, No. 171 ₱ doz. $42, | dis 37½&10 |
| Union Platform | $6, dis 45 |
| Fairbanks' | dis 20 |
| Buffalo Scale Co | dis 40 |
| Forsyth Scale Co | dis 25 |
| Howe's | dis 20&10 |
| Chatlilon's Eureka | dis 25 |
| Family Universal | dis 50 |
| Scale Beams | dis 33⅓&10 |

### Screws.

| | Dis |
|---|---|
| Flat head iron or steel [new list] per cent dis. | 55 |
| Flat head brass | 55 |
| Round head iron or steel | 50 |
| Round head brass | 45 |
| Brass and Silver capped. | 30 |
| Japanned, list of Plain Screws | 40 |
| Coach, patent Gimlet point, list per 100 | 65 |
| Lag, taper points | 70 |
| Bed | 10 |
| Machine, flat head, iron. round head, iron | 55 |
| Bench, iron | 50 |
| wood, beech, per doz $3 | 55&10 |
| wood, hickory | 10 |
| | 20&10 |

### Tinners' Tools & Machines

| | |
|---|---|
| Machines (P. S. & W.) | less 10 |
| Tools (P. S. & W.) | " 20 |

### Plumbers', Steam and Gas Fitters' Supplies.

| | |
|---|---|
| Wrought Iron Pipe | dis 70&10 |
| Malleable Iron Fittings | list |
| Grey Iron Fittings | dis 50 |
| Steam Brass Goods | dis 55 |
| Water " | dis 50 |
| Ludlow Gate Valves | dis. 20 |
| Register Gauge Cocks | net 1 00 |
| Montg'ry Gauge Cocks | $1 each |
| Steam Gauges | dis. 40 |
| Steam Guages 5 in. net dial per doz | 30 00 |
| Scotch Glass Tubes | dis. 70 |
| Tools | special. |
| Duplex Injectors | net. |
| Soil Pipe & Fittings, Mott's List | dis. 30 |
| Sinks, Mott's List | dis. 25 |
| Copper Bath tubs, Sinks, etc | dis. 25 |
| Galvanized Iron Boilers "Scaifes." | dis. 50 |
| Marble Slabs, Counter-sunk net per ft | $ 1 25 |

### Sheet and Tank Rivets.

"Norway."

| | |
|---|---|
| All sizes | dis. 15 |

### Boiler Rivets—"Albany."

| | |
|---|---|
| ½, ⅝, 11-16, and ¾ in. diam | 5 00 |

### Valves.

| | Dis. |
|---|---|
| Jenkins' Patent Gate Va, ves | 35 |
| " " Globe " | 40 |
| " Standard Packing " | 20 |

### Vises.

| | |
|---|---|
| Solid Box, list of July 1, '79, | dis 45 |
| Solid "Crown" (A. H. Hildick) | 40 to 100 lb, 15c net |
| Solid, Peter Wright's | 15⅓ |
| Solid, Wilkinson's | 13⅓ |
| Parallel, Parker's | dis 10 |
| " Simpson | dis 20 |
| " Prentiss | dis 15 |
| Saw Filers, Hopkins' | ₱ doz $17.50, dis 10 |
| " Wentworth's | 9 00 |
| Reading | dis 45&10 |
| Cowell Hand Vises | dis 20 |
| Richardson's Vise and Anvil | dis 25 |

### Wrenches.

| | |
|---|---|
| Coe's genuine | 50 |
| Girard Standard | dis 50 & 10 |
| Mechanics' 10 and 10 | dis. 50 |
| P. S. & W. Mechanics | dis 50&10 |
| Agricultural | dis 70 |

### Wire.

| | |
|---|---|
| Brass and Copper | dis 30 |
| Bright & annealed, Nos. 0@18 | dis 50@55 |
| " " Nos. 19@26 | dis 60 |
| " Nos. 27@36 | dis 65 |
| Coppered Nos. 0@18, | dis 45@50 |
| Galvanized, Nos. 0@18, market list | dis 45@50 |
| Tinned, Nos. 0@18, | dis 45@47½ |
| Cast steel | dis 40 |
| Tinned Broom Wire, Nos. 18@25 | dis 55 |
| Annealed Fence, Nos. 8 and 9 | dis 60 |
| Annealed Grape, Nos. 10 to 14 | dis 60 |
| Galvanized Telegraph, Nos. 7 to 9 | ₱ 1 |
| Galvanized Telegraph, Nos 10 to 11 | ₱ lb 8¼c |
| Galvanized Telegraph, No. 12 | ₱ lb 10½c |
| Fence staples | ₱ lb 5½@5¾c |
| Fence Staples, galvanized, | ₱ lb 6½@6¾c |
| Stubs Steel Wire | $6 00 to dis 30 |
| Barb Wire, painted | 7½8 |
| Barb Wire, galvanized | c |
| Crucible Steel Ropes fro in. at 9c to 1¼ in. at | ⅜ 52c |
| Best Selected Iron Ropes from 3-16 in. at 3c. to 1¼ in. at | 33c |

## TINNER'S STOCK.

### Tin.

| | | |
|---|---|---|
| Banca, | per lb. | 23⅛ |
| Straits | " | 22⅞c |
| English | " | 23c |
| Bar | " | 24½c |

### Tin Plate,

| | |
|---|---|
| IC 12x12 charcoal | $ 6 75 |
| IC 14x20 do | 6 75 |
| IX 14x20 do | 8 75 |
| DC 12½x17 do | 7 00 |
| DX 12½x17 do | 9 00 |
| DXX, 12½x17 do | 11 00 |
| DXXX, 12½x17 do | 13 00 |
| IC, 20x28 do | 13 75 |
| IX, 20x28 do | 17 25 |
| IC, 14x20, Best Roof | 6 00 |
| IX, 14x20, do | 8 00 |
| IC, 20x28 do | 12 00 |
| IX, 20x28 do | 16 00 |
| IC, 10x14 Best Coke | 6 00 |

Subject to card discount.

### Solder.

| | |
|---|---|
| Half and Half, in bars | 15 |
| No. 1 do | 14 |
| Spelter Solder | 25 |

### Pat Planished Sheet Iron

| | |
|---|---|
| [A] | per lb 10½c |
| [B] | " 9c |

| Nos | 10 | 15 | 21 | 25 |
|---|---|---|---|---|
| to | 14 | 20 | 24 & 26 | |
| Com | 3-10 | 3-30 | 3-40 | 3-75 |
| Char | 5-60 | 5-60 | 6-00 | 6-20 |

Sheets over 28 in. wide ¼c extra.

### Zinc.

| | |
|---|---|
| Sheet, cask | 6½c |
| Sheet, open | 7c |

## BRASS.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c per lb.

### High Brass.

All Nos not thinner than No 28, wider than 2 in. not wider than 14 inch ..... 30c
All Nos to No. 28 inclusive, and widths over 14 to 20 in. inclusive ..... 35c
All Nos to No. 28, inclusive, and widths over 20 to 30 in. inclusive ..... 38
½c per lb advance on each No above Nos 28 to 38, inclusive.
All Brass thinner than No. 8 is Platers' Brass at ..... 53c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 inches, in width wider than 2 inches 37c

### Low Brass.

4c pr lb. more than High Brass
Gilding metal 8c per lb. more than High Brass.

### Platers' or Gold Metal

| | |
|---|---|
| In Bars | 48c |
| Sawed | 51c |
| Planed or Polished | 54c |

### For Slitting.

Metal in width in. to ⅜ in. to No. 28, inclusive, 1c per lb, advance.
Metal, in width 2 in. to 1 in. thinner than No 28, 2c per lb. advance
Metal, in width ⅛ in to ¼ in. thinner than No 28, 5cper lb. advance.
Metal ¼ in. in width and less, 10c per lb. advance.
Any of the above widths cut to particular lengths add 7c per pound.

## COPPER.

| | |
|---|---|
| Lake Ingot | 15¼@16c |
| Baltimore | 14¾@15 |
| Arizona | 15@15¼c |

### Sheathing Brazier Copper, Bolts, etc.

| | |
|---|---|
| All sizes, 16 oz. per sq. foot, and over, per lb | 25c |
| " nd over per lb | 25c |
| Brazier's Copper, ordinary sizes, under 16 oz. and over 12 oz. per sq. foot, per lb. | 25c |
| Brazier's Copper, 10 oz. and 12 oz. per sq. ft. per lb. | 27c |
| Brazier's Copper lighter than 10 oz. per sq. ft. per lb. | 34c |
| Circles less than 84 inches in diameter per lb. | 33c |
| Circles 84 inches in diameter and over per lb. | 30c |
| Segment and Pattern sheets per lb. | 33c |
| Locomotive Fire Box sheets per lb. | 30c |
| Sheathing Copper, over 12 oz. per sq. ft. per lb. | 24c |
| Bolt Copper per lb. | 28c |
| Copper Bottoms per lb. | 31@32c |

No copper is Sheathing except 14x10 inches, and not to exceed 34 oz. to the sq. ft.

### Tinning.

| | |
|---|---|
| 14x48 per sheet | 6c |

All other size sheets, 2½c per square foot. For tinning both sides, double the above amount

## LEAD.

| | |
|---|---|
| Amerc'n, | ₱ lb 4¼c |
| Bar, | ₱ lb 5½c |
| Pipe, | ₱ lb 6¾c dis 10 per c |
| Sheet, | ₱ n 7¼c dis 10 per ct |
| Tin-lined pipe | 15c dis 10 per ct |
| Block | 45c. |
| Chilled Shot | 8c |

### Babbitt Metal.

| | |
|---|---|
| Babbit Metal, No. 3, 14 X | 42 |
| Babbit Metal, No. 2, 16 XX | 46 |
| Babbit Metal, No. 1, 18 XXX | 50 |
| Babbit Metal, C | 20 |
| Babbit Metal, B | 24 |
| Babbit Metal, A. | 32 |

Dis 40 per cent.

## IRON AND STEEL.

### Flat Bar.

| | | |
|---|---|---|
| 1½ to 4 by ¼ and 5-16 inch | | 2 10 |
| 4¼ to 6 by ⅜ to 1 inch | | 2 00 |
| 1¾ to 6 by 1¼ to 1½ inch | | 2 30 |
| 1¾ & 1¾ by ⅜ to ⅝ | | 2 00 |
| 1 & 1¼ by ⅜ to ⅝ | | 2 10 |
| ⅝ & ¾ by ⅜ to ⅝ | | 2 30 |

### Round,

| | |
|---|---|
| 1 to 1⅞ inch | 2 00 |
| 2 to 2¼ | 2 10 |
| 2⅜ to 3¼ | 2 40 |
| 3⅜ to 4 | 2 90 |
| 4¼ to 4½ | 3 40 |
| 4¾ to 5 | 3 60 |

### Square.

| | |
|---|---|
| 1 to 1⅞ inch | 2 00 |
| 2 to 2¾ | 2 10 |
| 2¾ to 3¼ | 2 40 |
| ¾ to 4 | 2 90 |
| 3¾ to ⅞ | 2 00 |

### Heavy Band.

1¼ to 6 by ⅛ and 5-16 inch 2 10
1 to 1¾ by ¼ and 5-16 do 2 20
¾ to ⅞ by ¼ and 5-16 do 2 40
⅞ to 1⅛ by ¼ and 5-16 do 2 80

### Half Oval and Half Round.

Wagon box iron ⅜ and ⅞ 3 50
1-10c per lb extra will be charged for cutting to specified lengths

### Light Band.

1¼ to 6 by ⅛ to 3-16 2 70

### Hoops.

| | |
|---|---|
| 1¼ to 2 , Nos 16 to 18 | 3 10 |
| 1¼ to 4 do 13 to 15 | 3 00 |

1-10 extra for each gauge lighter

### Sheet Iron.

| | |
|---|---|
| No 22 to 24 | 3 50 |
| No 25 to 26 | 3 70 |
| No 27 | 3 90 |
| No 28 | 4 30 |

### English Steel.

| | |
|---|---|
| Best cast | ₱ lb 16c |
| Extra cast | 16½c |
| Round machinery | 10c |
| Swaged, cast | 18c |
| Best double shear | 15½c |
| Blister, 1st quality | 13c |
| Refined tool steel | 16½c |
| Spring calking | 7¼@7½c |
| German steel, best | 11c |
| 2d quality | 10c |
| 3d quality | 9c |
| Sheet cast steel, 1st quality | 15½c |
| 2d quality | 14½c |
| 3d quality | 12¾c |

### American Steel.

| | |
|---|---|
| Best brands of refined cast steel, ⅜ to 2 inches | 12c |
| Crucible cast | 7c |
| Open-hearth ditto | 4½c |
| Hammer cast steel | 9c |
| Spring cast steel | 7½c |
| Bessemer and open-hearth spring | 5c |
| Ditto plow | 4½c |
| Steel boiler plate | 6½@7c |
| Bessemer machinery | 5 @6c |
| Spring and calking | 7¼@7½c |
| Tire | 5 |
| Sleigh shoe | 5 |

### Bessemer Steel Tire.

| | |
|---|---|
| ⅜ to 1 by 3-32 | 4½ ₱ lb |
| ⅜ to 1 by ⅛ to 5-32 | 4½ ₱ lb |
| ⅜ to 1 by 3-16 to ⅜ | 4½ ₱ lb |

### Miscellaneous Cast Steel.

| | |
|---|---|
| Auger and auger bit | 10 |
| Axle steel for wagons | 7 |
| Frog points and plates | 8 |
| Frog size bars | 8 |
| Pick, hammered | 10½ |
| Mattock, beveled | 9 |
| Table cutlery | 7¾ |
| Trap spring steel | 10 |
| Pike and cant hook | 8¼ |
| Coal and granite | 9 |

## SCRAP IRON AND OLD METAL.

DEALER'S BUYING PRICES

| | Per Ton. |
|---|---|
| No. 1 R R wro't scrap | $20 |
| No. 1 wrought scrap | 20 |
| No. 1 Machine cast scrap | 15 |
| Stove plate (free from burnt iron) | 11 00 |
| Grate bars | 7 |
| Pipes and flues (clean) | 14 |
| Tank iron | 14 |
| Hoop and band iron | 10 |
| Light sheet iron | 9 |
| Axle turnings | 15 00 |
| Wro't turning (f from cast) | 13 |
| Wro't iron, oily drillings | 9 |
| Cast borings | 8 50 |
| Malleable iron | 9 |
| Uncut wro't iron boilers | 15 |
| Old copper per lb | 11 |
| No. 1 H. Brass per lb | 11 |
| Heavy yellow Brass do | 9@10 |
| Light Brass per lb | 7@9 |
| Scrap Zinc per lb | 3@4 |
| Tea Lead per lb | 3 |
| Heavy Lead per lb | 4 |

## PIPE, WROUGHT.

Standard Wrought Iron Lap Welded Steam and Gas Pipe

| Inside Diameter. Inches. | Plain, Price Per Foot. | Galvan. or Enameled Per Foot. | Outside Diameter Inches. | Weight Per Foot. |
|---|---|---|---|---|
| ⅛ | 08 | | .40 | .24 |
| ¼ | 08 | $0 11 | .54 | .42 |
| ⅜ | 09 | 12 | .67 | .56 |
| ½ | 11 | 15 | .84 | .85 |
| ¾ | 13½ | 19 | 1.05 | 1.13 |
| 1 | 19 | 28 | 1.31 | 1.67 |
| 1¼ | 27 | 40 | 1.66 | 2.26 |
| 1½ | 33 | 47 | 1.90 | 2.69 |
| 2 | 46 | 64 | 2.37 | 3.66 |
| 2½ | 75 | 1 00 | 2.87 | 5.77 |
| 3 | 95 | 1 30 | 3.50 | 7.55 |
| 3½ | 1 25 | 1 70 | 4 00 | 9.05 |
| 4 | 1 50 | 2 05 | 4.50 | 10.73 |
| 4½ | 1 75 | 2 40 | 5.00 | 12.49 |
| 5 | 2 25 | 3 00 | 5.56 | 14.56 |
| 6 | 2 75 | 4 00 | 6.62 | 18.76 |
| 7 | 3 75 | .... | 7.62 | 23.00 |
| 8 | 4 75 | .... | 8.62 | 28.00 |
| 9 | 6 50 | .... | 9.68 | 34.44 |
| 10 | 8 00 | .... | 10.75 | 40.64 |
| 12 | 12 00 | .... | | 54.65 |

Discount, car load lots, 70 and 10 per cent. Less than car load 70 to 70&5.

## COAL,

WHOLESALE.

Wholesale f.o.b. cars at Cleveland:

| | |
|---|---|
| Carbon Hill and Monday Creek | $2 50 |
| Massillon | 2 70@2 80 |
| Palmyra, lump | 3 25 |
| Brier Hill | 3 50 |
| Pittsburgh | 3 00 |
| Salineville | 2 25 |
| Tuscarawas | 2 40 |
| Anthracite grate | 5 40 |
| Anthracite egg | 5 49 |
| Anthracite stove | 5 71 |
| Anthracite chestnut | 5 85 |

RETAIL.—Delivered.

| | |
|---|---|
| Massillon Lump | $4 00 |
| " Nut | 3 75 |
| Carbon Hill and Monday Creek, lump | 3 50 |
| Carbon Hill and Monday Creek, nut | 3 25 |
| Straitsville, lump | 3 75 |
| Straitsville, nut | 3 50 |
| Palmyra, lump | 4 50 |

75c less on cars by car load.
Anthracite Stove and Chestnut
Egg and grate

| | |
|---|---|
| | 6 50 |
| | 6 25 |

## OILS.

Pure Oils. p'kages included

| | |
|---|---|
| Sperm, winter bleached per gal | 1 30@1 33 |
| Whale, winter bleached per gal | 63@66 |
| Straits | 45@48 |
| Bank | 47@50 |
| Lard oil extra W S | 76@80 |
| do No 1 do | 68@73 |
| do No 2 do | 63@65 |
| Tallow oil | 73@76 |
| Neatsfoot oil pure | 95@$100 |
| do No 1 | 80@85 |
| Linseed oil, raw | 57@60 |
| do do boiled | 60@63 |
| Cotton seed oil white | 57@60 |
| do do yellow | 56@59 |
| West Virginia lubricating 28 deg | 15c@20c |
| Paraffine oil winter pressed | 22@25 |
| Capitol Cylinder | 85 |
| Model do | 65 |
| Eldorado Engine | 50 |
| Turpentine, per gal | 43 |

## GLASS.

(Per box of 50 feet)

SINGLE THICKNESS

| | |
|---|---|
| 6x8 to 10x15 | 8 00 |
| 11x14 to 15x24 | 9 00 |
| 16x24 to 20x28 | 10 25 |
| 15x34 to 24x30 | 11 25 |
| 26x28 to 24x36 | 12 00 |
| 26x36 to 26x44 | 13 50 |
| 26x46 to 30x50 | 14 58 |

DOUBLE THICKNESS Dis60&20

| | |
|---|---|
| 6x8 to 10x15 | 12 25 |
| 11x14 to 15x24 | 13 75 |
| 16x24 to 20x28 | 16 25 |
| 15x34 to 24x30 | 17 75 |
| 26x28 to 24x30 | 19 00 |
| 26x36 to 26x44 | 20 75 |

Dis 70

## Manufactures.

[Continued from page 4.]

chines are ordered to be sold for scrap iron, because they will not do the work. Judge Fulton, the assignee, says he does not think the whole will bring much more than one-third of the appraised value. There is some doubt as to the first mortgage being good, which the court, at its Fall term, will have to decide. If that is held, the creditors won't get a cent on the dollar; if otherwise, they may get 10 or 15 cents.

### PITTSBURGH AND VICINITY.

BY A TRAVELING CORRESPONDENT OF THE TRADE REVIEW.

THE contract for the iron ceiling work of the new Park Theatre (Cleveland) has been let to A Northrop & Co., Pittsburgh.

ON a recent visit to the works of the Wickless Oil Stove Co., Limited, Allegheny, Pa., a TRADE REVIEW representative was much interested in examining into the merits of their new wickless oil stoves, soldering furnaces, torches and stove furniture (Irwin's patent). The new principle is well worth studying.

THE Sharon, (Pa.) Boiler Works, Limited, report trade in the repairing line good, but not much new work. They are finishing up a blast furnace at New Castle (the Etna). They tore down the old furnace and replaced it with a new one. They place in six 50-inch boilers, two 18-inch flues to each boiler. They are about commencing to raise the Stewart Iron Co.'s furnace. They propose raising it 15 feet.

THE Union Chain Works of Reiter & Co., Pittsburgh, have been removed to Allegheny City. They are building a shop, size 35x80, 20 feet high. The link and machine shop is 50x90, 20 feet high; welding shop 40x30, 20 feet high; office 50x50, two stories. They will employ about 75 hands when they commence running, which will be in about two weeks. This firm has carried on this business six years. They ship all over the country and have a large railroad trade.

WILLIAM WHITE New Castle, Pa., has been in the boiler-making business ten years. Trade for the most part has been local, but now he is branching out in different directions. The size of his shop 40x70. All new machinery of the latest improved patterns is placed in his works. Mr. White is a practical mechanic and he oversees all work before leaving his establishment. He employs none but skilled hands. Trade at the present time is very fair. Among other articles made by Mr White are telescope and single gasholders, wrought and cast iron tanks for the same, purifiers, condensers, scrubbers, hydraulic mains, and all kinds of gas apparatus, wrought-iron roofs, bridges, girders, etc.

### IN GENERAL.

POPE & COLE, Baltimore, Md., send us circulars setting forth the merits of their new soldering coppers and pipe vises with knee plates.

Two thousand employees of the Bessemer Steel Work, South Chicago, have struck for an advance which, the officers say, amounts to about 100 per cent.

C. H. MITCHELL & Co., Chicago, find great difficulty in keeping abreast of orders for power machines. They are unusally busy at present fitting up elevators in Michigan, Illinois, Nebraska, Texas, Minnesota, Kansas, Wisconsin and Iowa.

THE Dixon Crucible Co., of Jersey City, N. J., are said to be the leading graphite house in the world. They own their mines, work them, sell the ore, dress the ore and make all the products in which graphite is an ingredient, crucible, pencils, stove polish, axle grease and graphite oil. The works are run full time, have not stopped a day in sixteen years except for repairs. Their pay roll is $3,500 per week. Their goods are the standard the world over. Their sales in 1882 were 30,000,000 lead pencils, 6,000,000 cakes of stove polish, and innumerable crucibles.

MR. J. H. Sargent proposes to erect a four-story business block on his property, Pearl street, this city.

## Books, Newspapers, Etc.

CHICAGO, unusually prolific of trade journals, presents a new venture in the Farm Implement and Country Hardware Trade. From the specibefore us we judge it will ably fill its chosen field.

COMPLETE in all of its departments, the Paper World, published at Holyoke, Mass., in the interest of the paper trade, speaks of the energetic and painstaking care of its managers in every issue.

FRESH evidence of the prosperity as well as good taste of the proprieters of the American Artisan, Chicago, is afforded in the recent addition of an artistically designed cover, in keeping with the attractive letter-press of that excellent journal.

IN keeping with the spirit of the holiday season, the August St. Nicholas blossoms out with numerous amusing and instructive sketches which will at once absorb the attention of the boys and girls of America. To mention the best article would necessiate mentioning all, for St. Nicholas is a paragon of excellence.

THE current issue of the Sketch Book, published by the Cleveland Academy of Art, shows continued improvement which we hope to see soon followed by elimination of studies of questionable artistic finish. Mr. W. H. Eckman, the able and enterprising editor, is, we understand, to hereafter devote his entire time to the interests of the magazine.

AN article which will attract the attention of technical readers is that in August Lippincott's on "Government Engineers," by Frank D. Y. Carpenter, in which he complains with much justice and force that the civil engineers employed by the government receive no adequate recognition for their services, the military officers monopolizing the credit and prestige of public works which they neither devise nor execute. The other articles are fully up to the high standard of this excellent periodical.

APPARENTLY an outgrowth of the National Exposition of Railway Appliances, the American Journal of Railway Appliances, with New York as its headquarters and Chicago as its chief Western office, makes its bow to the public, and a graceful bow it is. With an attractive head, a systematic make-up, well filled columns, and generous advertising patronage from the very start, it looks as if it were destined for a long and prosperous career. Mr. Robert Grimshaw, a well-known mechanical expert and a voluminous writer, is the editor, ably assisted by a strong staff of experienced technical journalists.

THE Diseases of Memory. By Th. Ribot. No. 46 of the "Library of Science." Price 15 cents, post-paid. J. Fitzgerald, Publisher, 20 Lafayette Place, New York. A profoundly interesting work, full of curious facts. But it is more than that: it is a poilosophical study of the phenomena of memory as exhibited in sundry forms of mental disease. It offers a scientific explanation of many abnormal conditions of memory which from time immemorial have puzzled students of mental science. The book will be read with interest by all who believe that, "the proper study of mankind is man."

"BUFFLAND" and "Clevalo" are the easily recognized cities "on Lake Erie" in which the anonymous author of "The Bread-winners," in the Midsummer Century, introduces his (her?) already interesting romance. Of course story-readers will turn to this new serial first of all. Those who enjoy out-door life will find ample food in "Bob White the Game Bird of America," "The Oldest Club in America" and "Under the Olives." The frontispiece, and an admirable essay by Henry James, have to do with the leading French novelist of the day,—Alphonse Daudet,—whom Mr. James places at the head of living writers of fiction. Space forbids further particularizing. The Century, indeed, must be seen and regularly read to be fully appreciated.

THE North American Review for August opens with a very spirited discussion of the subject of "Moral Instruction in the Public Schools," by Rev. Dr. R. Heber Newton, who offers a practical scheme for conveying ethical instruction without reference to religious tenets, and Rev. Dr. Francis L. Patton, who maintains that the Bible must be made the basis of all moral teaching. Henry D. Lloyd exposes the tricks and frauds of speculation in grain, which operate to make bread dear, and maintains that that they should be repressed by law. as being flagrantly in opposition to public policy. "Woman in Politics," by ex-Surgeon-General Wm. A. Hammond, is a caustic discussion of certain facts of nervous organization which in his opinion render the female sex unfitted for participation in public affairs. Hon. Francis A. Walker reviews "Henry George's Social Fallacies," criticizing in particular his doctrines regarding land-tenurs and rent. The evils resulting from "Crude Methods of Legislation." both national and State, are pointed out by Simon Sterne. Charles F. Wingate writes of "The Unsanitary Homes of the Rich," and there is a joint discussion of "Science and Prayer," by President Galusha Anderson and Thaddeus B. Wakeman. Published at 30 Lafayette Place, New York, and for sale by booksellers generally.

### The Evolution of the Screw Propeller.

Says the American Engineer of Chicago, on a subject of local interest: Mr. J. F. Holloway, in his recent paper on "Marine Engines on the Lakes, and a Device for Getting them off the Dead Centres," says "it was upon these inland waters of the lakes that the value of the screw propeller was first recognized as being the best method of propelling vessels by steam." We think there are many who would take exception to this statement. It is, of course, a difficult matter to define just when and where the value of the screw propeller was first recognized as being the best method of propelling vessels, since the growth and adoption of this propelling device has been a gradual and progressive one for many years, but still it seems to us that Ericsson is entitled to the greatest credit for making the propeller a success, and gaining recognition for its practical value. Again, Mr. Holloway says: "While the largest engineering establishments of our country—such as the Allaire, Secor, Novelty, and other large works—were persistently engaged in fitting out ships with beam engines and side-wheels, the engine builders here in the West were building screw propellers to take the place of the beam engines then in use here." Mr. Holloway apparently forgets that the large engine-builders in the East, to whom he refers, were in the habit at the period he mentions, of putting propellers in the smaller vessels, tug-boats and the like, and were also building propellers for use along the coast, where the depth of water would permit. Of course they did not furnish propellers on vessels which had to pass numerous bars, and where the depth of water was very low and variable; and those vessels are supplied at the present time in the East, and we think wisely too, with paddle wheels. The deep water and free harbors throughout the lake region in the West, admitted the use of propellers and they were wisely adopted, but the condition of sound and inland traffic in the East did not admit this. Still, propellers were in extensive use in the East for the class of vessels we have mentioned above, and were being built by the firms mentioned, at the same time that they "were persistently engaged in fitting out ships with beam engines and side wheels." In fine, they were building both screw propeller and paddle wheel engines at the same time, and the West, it seems to us, is not entitled in this particular to the broad credit which Mr. Holloway assigns to it.

THE weight of any bar of wrought iron may be found by these rules: Flat and square iron: multiply the area of the end in inches by the length in feet, and this product by the constant number 3.33; the quotient is the weight in pounds. Round iron: multiply the square of the diameter in inches by the length in feet, and the product by the constant 2.61; the quotient is the weight in pounds.—[Mech. Engineer.

COMMERCIAL travelers or salesmen in the United States, according to statistics number in round figures 200,000, and are maintained at an average cost to their employers of $3,000 each, including salaries and road expenses, or an aggregate of $600,000,000 per annum.

## Cheapest and Best Book of its Class Published.

**A $5 Book for $2.50! Embodies the Leading Details in 200 Trades!**

## Moore's Universal Assistant and Complete Mechanic

**Contains over 1,000,000 Industrial Facts, Processes,** Calculations, Legal Items, Business Forms, Rules, etc., of paramount utility to every Manufacturer, Mechanic, Farmer, and Business Man. Gives full details about Lumbering, Sawmills, Planing Mills, Saw-filing, Speed of Wheels, Pulleys, Drums, Circular Saws, Wood-working Machinery, etc. On Mill-dams, Water-wheels, Horse-power of Streams, Power of Steam, Wind, etc.; Tensile, Torsional, and Crushing Strength of Materials; Seasoning of Timber (12 ways), Logging, Cost of Supplies, Stream-driving, Lumber Measurement and Surveyors' Tables, full and complete. Details for Cotton, Woollen, and Fulling Mill Machinery; do. for Flour, Oatmeal, Shingle, Paper, and Wind Mills, Grain Elevators, Sugar, Oil, Marble, and Rolling Mills, Blast Furnaces, Gas-works, Water-works, Hydraulics, etc. The work contains 500 ENGRAVINGS, 461 TABLES, containing over 500,000 Calculations; full details for Constructing, Operating, and Repairing Mill and Steam Machinery of every kind. New process Milling, Balancing Mill-stones, Setting of Valves, Link and Valve Motion, Eccentrics, Indicator Diagrams, Injectors, Steam Boilers, Gauges, Machinists' Tools, Mechanical Movements, Tunnelling, Mining, and Rock-drilling Machinery; Plans of Mills, Bridges, etc. Instructions to ENGINEERS, FIREMEN, BOILER-MAKERS, ENGINE AND CAR BUILDERS; Proportion of Engines, Boiler and Steam-pipe Covering, Scale Preventives (10 kinds), Cements (60 kinds), Steam-packing, Bright Polish (4 kinds). Details for Locomotive and Railroad Car Construction; to Repair Locomotive Break-downs on the Road; details in immense variety for Gas, Steam, Civil, and Mining Engineers, Machinists, Blacksmiths, Iron-founders, Miners, Metallurgists, Assayers, Plumbers, Gas-fitters, Tinmen, Coppersmiths, Builders, Metal and Wood Workers of every trade. Alloys for all purposes (418 kinds). On Prospecting, Mining, Processes of Gold and Silver Extraction, Refining, etc. On Lathe-gearing, Screw-cutting, Gear-cutting, Gearing Compound Lathe, Turning, Boring, Filing, Finishing, Bevel-gears, Shafting, Belting, Friction, Tool-making, Tempering, Annealing, Toughening and Tempering of Steel, Tempering Liquids, Metallic Tempering Baths, Welding Compounds, Case-hardening, etc., U. S. Government $10,000 Tempering Secret. To make Cutting, Drilling, and Boring Tools, Screws, Taps, Files, Emery Wheels, Reamers, Cold Chisels, Safes, Springs of all kinds, Mill-picks, Stone-cutters' Tools, Cutlery, Dental and Surgical Instruments, etc. Items for Iron, Brass, Bronze, Type, Stereotype, and Bell Founders, Pattern-makers, etc. Diam., Circ., and Areas of Circles, Pitch of Wheels, Specific Gravities, Expansion of Metals, Smelting of Metals, Reducing of Oxides, Making of Crucibles, Weight of Metals, Capacities of Tanks, Cisterns, Boilers, Weight of Water, Heating of Buildings, Jointing of Pipes, etc. To Compute Power of Steam Boilers. Bronze Dips, Lacquers, Japans, etc. (93 kinds). Carpentry, Diagrams of Roofs, Tonnage Tables, Stowage in Ships, Modelling of Vessels, Ship-building, Navigation, Solid Contents of Boxes, Bales, Stones, Barrels, Timber, Freights by Rail and Water, Tonnage Rules, Estimates, Tables, etc., for Masons, Bricklayers, Plasterers, Roofers, Stucco Workers. On Art work, Decoration, Painting, Sign Writing, Frame Gilding, Wood Staining, Varnishing, Polishing, Glass Signs, etc., (600 Items). Glass Staining and Gilding, Photography, Restoring Old Paintings, etc. 500 Items for Watchmakers, Jewellers, Gilders; 800 Items for Printers, Authors, and Publishers; 400 Health Items. Details for Merchants on Banking, Bookkeeping, Advertising, Safe Business Rules, etc.; Exchange Tables, Ready Reckoner, Interest, Coal, and Tonnage Tables, Standard and Metric Systems of Weights and Measures, Sterling Tables, Rules for Computing Profits, Percentages, etc.; 400 Receipts for Grocers, Confectioners, etc.; 300 Receipts for Dyers, Bleachers, Hatters, Paper Manufacturers, Pulp Colors, etc.; 400 for Trappers, Tanners, Curriers, Boot, Shoe and Harness Makers; 10,000 Trade Secrets and Scientific Facts. Thousands of details for Farmers; Land, Grain, Hay, and Cattle Measurements, Contents of Granaries, Corn-Cribs, etc.; Fencing, Ploughing, Planting, Seed, and Breeding Tables, Food and Manure Values, 16 Fertilizers, Horse and Cattle Remedies, all kinds. To Break, Train, and Shoe Horses, Rotation of Crops, to Kill Farm Pests; Rural Economy, Soiling of Stock, Bee-keeping, Construction of Hives, Plans of Barns, Butter and Cheese Making, etc. Business Forms, all kinds. Legal Items, Special Laws of 49 States, Territories, and Provinces (in the U. S. and Canada) relating to the Collection of Debts, Exemptions from Forced Sale, Mechanics' Lien, the Jurisdiction of Courts, Transfer of Real Estate, Rights of Married Women, Interest and Usury Laws, Limitation of Actions, etc.

"Is a reference library in itself."—*Amer. Grocer.* "An ample study for a whole winter."—*Maryland Farmer.* "Forms complete treatises on the various subjects."—*Sci. Am.* "This may be called a book of wonders, for it has a compilation of information from all avenues of knowledge. No where else can such a mine of intellectual wealth be found; it should be in every household; certainly in every office and workshop."—*Kan. City Times.* "There have been many attempts to put a library into one volume, and certainly no previous attempt has been so successful as this one."—*The Methodist.* "A regular condensed UNIVERSAL ENCYCLOPEDIA."—*Mfr. and Bldr.* "The ASSISTANT is the most complete and valuable of any work of its kind we have ever seen."—*Am. Machinist.* Counting cost of production, the ASSISTANT is the cheapest work of its class published. It contains 1016 pages, is a marvellous repertory of valuable information, and worth its weight in gold to any Mechanic, Farmer, or Business Man. 1 vol. 12mo. Free by mail to any address, in best English cloth, for **$2.50**; in leather, library style, lettered back and marbled edges, for **$3.50**.

We will send the above work as a PREMIUM to every new subscriber to the TRADE REVIEW AND WESTERN MACHINIST who sends the regular subscription price—$3.00—and 15 cents to pay postage on PREMIUM.

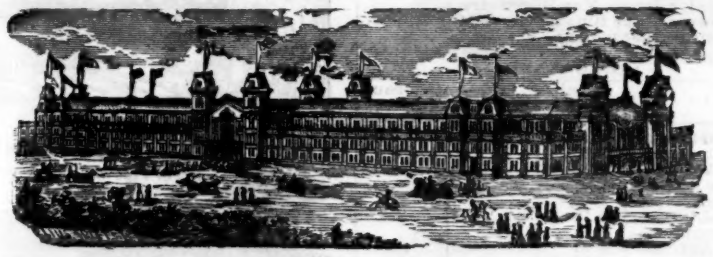
This is the best and most practical book ever offered as a PREMIUM to mechanics of all trades.

Send in your subscriptions and GET THE PREMIUM at once. Address

DAY & CARTER, Publishers,
122 Water street, CLEVELAND, O.

## SEVENTH ANNUAL EXHIBITION.

# PITTSBURGH EXPOSITION SOCIETY.



OPEN FROM SEPTEMBER 6 TO OCTOBER 13, 1883.

**Artists, Inventors, Mechanics and Manufacturers of America are cordially invited to participate.**

BUILDINGS AND GROUNDS OCCUPY AN AREA OF TWENTY-TWO ACRES.

☞ For Prospectus and Entry Blanks address

E. P. YOUNG, General Manager. J. C. PATTERSON, Secretary.
P. O. BOX 895, PITTSBURGH, PA. 92

## ZELOTES WOOD & CO.,

PROPRIETORS

COLUMBUS

# Malleable Iron Works.

**TINNING AND JAPANNING A SPECIALTY.**

Columbus, Ohio.

## MONTGOMERY & CO.,

IMPORTERS OF

**STUBS' FILES, TOOLS AND STEEL.**

GROBET SWISS FILES,

GEO. W. MONTGOMERY,
GEO. W. CHURCH.

## Chesterman's Measures,

Hubert's French Emery Paper, Horse Shoe Magnets, Etc.

Wm. Smith & Son's Celebrated Music Wire.

French Sheet Steel 3¼ in. Wide, from 4 to 65 Thousandths.

Machinists', Silversmiths', Jewelers', Die Sinkers and Sewing Machine Manufacturers' Supplies.

**105 Fulton Street, New York.**

**THE MONOLITH.**

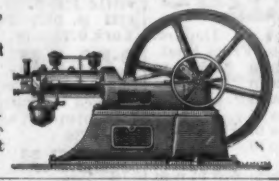
**FINE WOOD PHOTO-ENGRAVING**
SEND COPY FOR ESTIMATE IT WILL PAY YOU 702 CHESTNUT ST PHILA PA
CROSSCUP & WEST

## NEW OTTO SILENT GAS ENGINE.

Working without Boiler, Steam, Coal, Ashes or Attendance.

**Started instantly by a Match, it gives full power immediately. When stopped all expense ceases.**

No explosions; no fires nor cinders; no gauges; no pumps; no engineer or other attendant while running. 01

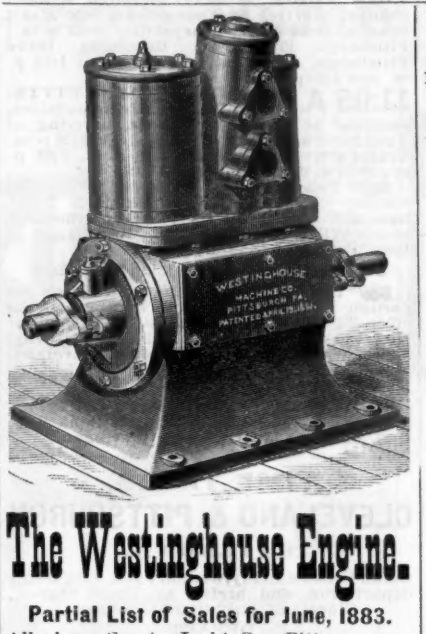


Unsurpassed in every respect for hoisting in warehouses, printing, ventilating, running small shops, &c., 2, 4 and 7 H. P. and upwards. Built by **Schleicher, Schumm & Co.,** PHILADELPHIA.

ALBERT FISHER,
Agent for Cleveland.
48 Merwin Street, Cleveland, O.

## Merrill Brothers, DROP HAMMERS,

**28 First Street,** FORGINGS and
Brooklyn, N.Y. DROPPED FORGED TURNBUCKLES.




## The Westinghouse Engine.

**Partial List of Sales for June, 1883.**

| | |
|---|---|
| Allegheny County Light Co., Pittsburgh, Pa | 125 H. P. |
| Water Works, Council Bluffs, Ia., Centrifugal Pumps, | 100 " |
| Water Works, Council Bluffs, Ia., Centrifugal Pumps, | 100 " |
| R. H. Brown & Co., New Haven, Conn Machinists | 100 " |
| H. I. Proctor, Ogdensburg, N. Y., Planing Mill | 100 " |
| Fred. Oliver & Co., Charlotte, N. C., Oil Mill | 65 " |
| Hitchcock & Bradley, Bending Co., Ashtabula, O | 65 " |
| Leader Sewing Machine Co., Cleveland, O | 65 " |
| N. Y. & Brooklyn Elect. Lt. Co. New York City | 50 " |
| T. A. Willson, Reading, Pa., Manufacturer of Spectacles | 30 " |
| G. Merz, Chicago, Ill., Cigar Boxes | 25 " |
| C. N. Nelson Lumber Co., St. Paul, Minn | 25 " |
| Emma Oil Co., Pine Bluff, Ark., Ginning | 18 " |
| Davis Church Organ Co., Buffalo, N.Y | 18 " |
| Cole Bros., Canby, Oregon, Saw Mill | 18 " |
| James Gage, Rockland, N. Y., Saw Mill | 18 " |
| Central M'f'g Co., Montgomery, Ala., Ginning | 12 " |
| John Bain, Toronto, Canada | 12 " |
| W. H. Reed & Co., Chillicothe, O., Planing Mill | 12 " |
| Green & Clay, Waxahachie, Tex., Ginning | 10 " |
| B. Frank Mohr, Mifflinburg, Pa | 8 " |
| H. L. Smith, Montgomery, Ala., Ginning | 8 " |
| Carrow, Bishop & Co., Philadelphia, Pa., Jewelers | 8 " |
| Louis Cook Carriage Co, Cincinnati, O. | 8 " |
| General Rosser, Minneapolis, Minn. Yacht | 8 " |
| A. C. Rand, Minneapolis, Minn. Yacht | 8 " |
| Post & Co., Cincinnati, O. | 4 " |
| San Antonio "Express," San Antonio, Tex | 4 " |
| Total | 1,024 H.P. |

**The Westinghouse Machine Comp'y**
PITTSBURGH, PA.

## Beaver Falls Steel Works.

BEAVER FALLS, PA.
Manufacturers of all kinds of STEEL. Special "Beaver" Tool, Die, and Axe Steel, Iron Center, Soft Steel Center, and Cast Plow Steels. Open Hearth Bessemer Agricultural Steel Shapes. Finished Rolling Coulters and Patent Cutlery Steel. 82

## JOHN H. O'MARA,

NEW LISBON, OHIO,

Manufacturer of the celebrated

# Excelsior Diamond Grit GRINDSTONES.

The best in the market

**FOR WET AND DRY GRINDING,**

AND FAST CUTTING.

Manufactured in sizes from 3 feet 6 inches to 8 feet in diameter; in thickness from 6 inches to 25 inches. Orders solicited.

82 JOHN H. O'MARA.

## I. E. MERRITT,

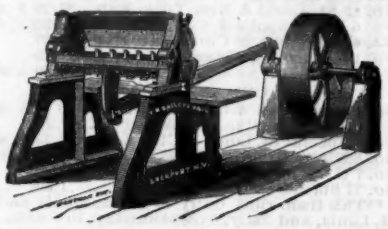
MANUFACTURER AND BUILDER OF

MILLING MACHINES.

KEY-SEATING MACHINES.

AUTOMATIC SAWING MACHINES.

SHINGLE, HEADING, STAVE, AND HANDLE MACHINERY



**Vaneer Cutting Machines for Cutting Berry Box and Picture Back Lumber from the Log.**

Also Second-hand Machinery of all kinds.

Lockport, N. Y.

33 **Send for Catalogue.**

**WISE** people are always on the lookout for chances to increase their earnings, and in time become wealthy; those who do not improve their opportunities remain in poverty. We offer a great chance to make money. We want many men, women, boys and girls to work for us right in their own localities. Any one can do the work properly from the first start. The business will pay more than ten times ordinary wages. Expensive outfit furnished free. No one who engages fails to make money rapidly. You can devote your whole time to the work, or only your spare moments. Full information and all that is needed sent free. Address STINSON & Co., Portland, Maine.

## Harris Iron Works.

SOLE MANUFACTURERS OF

**The Harris and New Harris**

# Hot Air Furnace

Fine Castings and Job Work of all kinds to order. Send for prices and catalogues.

143 to 147 Perry street, BUFFALO, N.Y. 19

FRICTION

## HOISTING ENGINES,

SOMETHING NEW IN DESIGN FOR

## Double Dock Hoisting Engines

The Engines are mounted on an A frame, bolted to a strong bed-plate, and by the side of the boiler, but not dependent upon the boiler, making the most convenient double engine, taking up less space, and can do more and better work than any other of the same dimensions.

FOR RAILROAD BRIDGE

Building, Pile Driving and other Heavy Work it has no equal for efficiency.

For Circulars and information, Address

D. FRISBIE & CO.
481, N. 5th St. Philadelphia Pa. 62.

## TRAVELERS' REGISTER.

### Lake Shore & Michigan Southern.

| TRAINS GOING EAST. | Arrive. From West. | Depart. From East. |
|---|---|---|
| Fast N. Y. Express | *1 35 a m | *1 50 a m |
| N.Y.,Bo't'n & At. Ex. | *7 05 a m | *7 30 a m |
| Elyria Accommodation | †8 35 a m | ..... |
| Pt.Clinton Accomd'at'n | †11 00 a m | ..... |
| Buffalo Accommodation | †11 00 a m | †11 15 a m |
| N. Y and B't'n Fast Ex. | *2 25 p m | *2 55 p m |
| Conneaut Accom'dation | ..... | †4 50 p m |
| Night Express | †10 10 p m | †10 35 p m |

| TRAINS GOING WEST. | Arrive. From East | Depart. From west. |
|---|---|---|
| Fast Limited Express | *12 23 a m | *12 33 a m |
| Mich. Ex. via Sandusky | *2 50 a m | *3 05 a m |
| Chi. Ex. via Sandusky | ‡6 35 a m | 7 00 a m |
| Mich. Ac. via Norwalk | ..... | †6 40 a m |
| Conneaut Accom'dat'n | †8 40 a m | ..... |
| Toledo Ex. via Norwalk | †1 25 p m | †3 30 p m |
| St. Louis Ex.via San'ky | *1 40 p m | *2 05 p m |
| Chi. Pac.Ex. via Nor'lk. | *7 05 p m | *7 35 p m |
| Pt.Clinton Accom'dat'n | ..... | †5 00 p m |

Sunday trains for Nottingham—Depart 0:00 a. m. and 2:15 p. m., return at 10:05 a. m. and 4:45 p. m.

Reference marks—*Daily. †Daily except Sunday. ‡Daily except Monday.

### Cleveland, Columbus Cincinnati & Indianapolis.

ARRIVALS.

No. 2 Col. & Cin. & Ind'polis Ex. ....*7 10 A.M
No. 8 C. L. & W. and Galion Exp.... 9 30
No. 12 St. Louis & New York Exp..*3 20 P.M
No 6 Indianapolis & Columbus Exp10 00
No. 4 Columbus & Cincinnati Exp..*3 50
No. 10 Wheeling Express..... 7 15
No. 14 Cincin. New York fast line,..1 40 A.M

DEPARTURES.

No. 1 Cincinnati & Columbus Exp...*8 00 A.M
No. 11 Cleve, Indianap.&Wheel'g Ex 7 10
No. 3 Special St. Louis & Cin. Ex...**2 15 P.M
No. 5 Night Express.....*7 10
No. 7 C. L. & W. and Galion Exp .... 5 00
No. 17 Spec. Col. Cin'ti. Exp..... 1 50

**This train runs daily to Indianapolis and St. Louis, and daily, except Sunday, to Cincinnati.

### Cleveland, Lorain & Wheeling.

ARRIVALS.

Wheeling & Cleveland Express.....7 15 P.M
Uhrichsville Express..... 9 30 A.M

DEPARTURES.

Wheeling & Cleveland Express..... 7 10 A.M
Uhrichsville Express ..... 5 00 P.M

### New York, Pennsylvania & Ohio.

ARRIVALS.

No. 1 New York Expaess.....* 6 40 a.m.
No. 7 Mahoning Valley Ac..... 11 55 a.m.
No. 5 Fast N. Y. & Pitts. Ex.....* 1 40 p.m.
No. 3 N. Y. & Pittsburgh Ex.....* 7 05 p.m.
No. 9 Youngstown & Pitts. Ac..... 10 15 p.m.

DEPARTURES.

No. 12 N. Y. & Pitts. Express.....* 7 20 a.m.
No. 6 Youngstown & Pitts. Ac..... 11 05 a.m.
No. 4 Fast N. Y. &Pitts. Express..* 2 50 p.m.
No. 2 Mahoning Accommodation.. 4 35 p.m.
No. 8 N. Y. and Pitts. Express ... 11 05 p.m.

* Sunday trains.

### Cleveland & Pittsburgh.

| | ARRIVE. | DEPART |
|---|---|---|
| Pittsburg & Wheeling | 2 30 P.M | 8 25 A.M |
| Express | 7 30 | 2 00 P.M |
| Alliance Accommodation | 10 10 A.M | 3 45 |
| Ravenna Accommodation | 8 37 | 5 30 |
| Night Express | 6 25 A.M | †11 40 P.M |
| Newberg Accom'dation | 12 10 P.M | 11 00 A.M |
| Newberg Accom'dation | 1 50 P.M | 12 30 P.M |

† Night Express runs daily, except Saturday, by way of Wellsville, and on Saturday by way of Alliance.

### Valley Railway.

| | ARRIVE. | DEPART |
|---|---|---|
| Wheeling Junction | 10 15 A.M | 8 30 A.M |
| Canton | 1 35 P.M | 6 15 P.M |
| Wheeling Junction | 6 15 P.M | 3 20 P.M |

Special trains leave on Sunday at 4.20 P.M., arriving at Cleveland at 7.15 P. M.

Depot foot of South Water Street.

### Connotton Valley Railway.

| | ARRIVE. | DEPART. |
|---|---|---|
| Passenger | 8 00 a. m. | 8 10 a. m. |
| Passenger | 10 20 a. m. | 2 00 p, m. |
| Passenger | 6 35 p. m. | 4 25 p. m. |

Depot corner Commercial and Fifth Streets

### Cleveland, Akron & Columbus Railroad,

Cleveland, Akron & Columbus Railroad, running over Cleveland & Pittsburgh Rail road to Hudson, for Akron, Columbus, etc.

| | ARRIVE. | DEPART. |
|---|---|---|
| Mail | 2 30 P.M | 8 25 A.M |
| Express | 7 30 | 2 00 P. M |
| Accommodation | 10 10 A.M | 3 45 P. M |

### "The Nickel Plate."

| | ARRIVE. | DEPART |
|---|---|---|
| Local Passenger | 10 00 P.M | 3 48 P.M |
| Local Passenger | 9 18 A.M | 6 55 A.M |
| Conneaut Accom'dation | 9 05 A.M | 4 30 P.M |

## Cleveland to New York,

VIA THE

NEW YORK, PENNSYLVANIA AND OHIO RAILROAD.

[Formerly Atlantic & Great Western Railroad]

For New York, Boston and the East. The shortest and quickest route to Pittsburgh Washington, Baltimore and the Southeast.

Until further notice trains will leave the new Central Depot, South Water Street and Viaduct, as follows:

**7 20A.M.** LIGHTNINGEXPRESS(daily) sleepingand hotel coaches from Leavittsburg, 9:05 a.m. To New York, Albany and Boston without change. Parlor car, Cleveland to Salamanca. Arrives at Meadville 11:20 a.m., (dinner); Franklin, 12:33 p.m.; Oil City, 1:00 p.m.; Corry, 1:00 p.m.; Jamestown, (Lake Chatauqua) 1:57 p. m.; Buffalo, 6:15 p. m.; Rochester, 8:30 p.m.; Hornellsville, 6:40 p. m., (supper); Corning, 8:25 p.m.; Elmira, 8:57 p.m.; Binghampton, 10:58 p.m.; Albany, 6:00 a.m.; Boston, 2:45 p.m.; arriving at New York, 6:50 a.m.

**2:50P.M.** LIMITED EXPRESS, Pull-Sleeper Cleveland to New York, (daily). Arrives at Meadville, 6:55 p m.; Jamestown, 9;13 p. m.; Salamanca, 10:10 p. m.; Now York, 10:25 a. m.

**11:25 P.M.** NIGHT EXPRESS, (daily except Sunday), Sleeping Coach from Leavittsurg to New York without change. Arrives at Youngstown, 1:45 a.m.; Pittsburgh, 6:15 a. m.; Washington 9:15 a. m.; Baltimore 10:34 p. m.; Meadville, 3:50 a. m.; Corry, 5:20 a.m.; Jamestown, 6:22 a.m.; Buffalo, 9:45 a. m.; Rochester, 1:10 p. m.; Hornellsville 1:20 a. m.; Corning, 12:53 p. m.; Elmira 1:21 p. m.; Binghampton, 2:50 p.m.; New York 9:25 p.m.

**2:50 P.M.** PITTSBURGH EXPRESS, daily, through without change. Parlor Car, Cleveland to Pittsburgh, arrives at Youngstown, 5:00 p.m.; Pittsburgh, 7:48 p.m.; Washington, 7:30 a.m.; Baltimore, 8:19 a.m

**4:35 P.M.** MAHONING ACCOMMODATION, stopping at all way stations. Arrives at Youngstown, 7:25 p.m; Sharon, 8:30 p.m; Sharpsville 8:40 p. m; connects at Leavittsburg with train No. 20 for Meadville and intermediate points, arrives at Meadville, 11:05 p.m. Pittsburgh, 10:48 p. m.

**7:20 A.M.** PITTSBURGH EXPRESS, —(daily) through without change. Arrives at Youngstown, 9:50 a.m.; Sharon, 10:55 a.m.; Sharpsville, 11:05 a.m.; Pittsburgh, 12:45 p.m. Returning, leave Pittsburgh, 4:48 a.m., 8:33 a.m., and 1:13 p. m. and 4:20 p.m.

**11:05 A.M.** YOUNGSTOWN& PITTSBURGH Accommodation, stopping at all Way Stations, arriving at Youngstown 1:50 p.m.; Pittsburgh, 6:10 p.m. Trains arrive at Cleveland, 6:40 a.m., 7:05 p. m., 10:55 a. m 1:40 p.m., and 10:15 p.m.

☞ This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City, and intermediate points WITHOUT CHANGE. No change to Boston and New England cities.

### Baggage Checked Through to All Points East

☞ Through Tickets and information regarding the route can be obtained at the office 131 Bank street, and at newDepot of New York, Pennsylvania and Ohio Railway, South Water street and Viaduct, Cleveland.

A. E. CLARK,
Gen. Pass'r. Agt., Cleveland, Ohio.
M. L. FOUTS,
J. M. FERRIS, Pass. Agt.,131 Bank st.,
Gen. Man'gr, Cleveland Cleveland.

## TIME TABLE.
## CLEVELAND & PITTSBURGH
### RAILROAD.

On and after Sunday, January 21st, 1883, trains depart from and arrive at Union Station, Cleveland, (city time) as follows:

DEPART.

For the East--8:20 A.M.; 1:55 P.M., 11:35 P.M
For Alliance--3:40 P.M.
For Ravenna--5:25 P.M.
For Newburgh--10:55 A.M; 12:25 P.M.
On Sunday for the East, at 11:35 P.M.

Train leaving for the East (week days) at 1:55 P.M. has sleeping car through to Philadelphia and New York.

Train leaving for the East every night at 11:35 has sleeping car to Pittsburgh.

On Saturday night the train for the East leaving Cleveland at 11:35 runs from Alliance to Pittsburgh via P.F.W. & C. Railway.

ARRIVE--(Week Days.)

From the East--6:20 A.M.; 2:25 P.M.; 7:25 P.M
From Alliance--10:05 A.M.
From Ravenna--8:32 A.M.
From Newburgh--12:05 P.M.; 1:45 P.M.

Time tables, rates of fare, through tickets and further information can be obtained from M. G. Carrel, agent, Union Station, or C. L. Douglass, No. 212 Bank street.

WM. A. BALDWIN, Manager, Pittsburgh, Pa.
E. A. FORD, Gen. Pass. Agt.

## Bee Line.

Cleveland, Columbus,Cincinnati & Indianapolis Railway.

The Great Central Trunk Route to the Ohio and Mississippi Rivers.

### Three Trains Week Days,

TWO TRAINS SUNDAY.

Leave Cleveland with Through Palace Coaches and Elegant Sleeping Cars for

**Columbus, Cincinnati,**

**Indianapolis, Terre Haute**

**and St. Louis**

### Without Change.

This is the only line making Direct Connection with all the principal Trunk Lines of the East for all Southern, Southwestern and Western points, either by way of Cincinnati, Indianapolis or St. Louis for all railway towns in Missouri, Arkansas, Texas, Kansas, Nebraska, Colorado, New Mexico, Old Mexico and the Pacific Coast.

Equipment New and Comprising all Modern Improvements.

The Best Roadbed and Safest Road in the West.

Tickets by this popular route for sale at all regular ticket offices.

**E. B. Thomas,** General Manager.
**O. B. Skinner,** Traffic Manager.
**A. J. Smith,** Gen'l Pass. Agent, CLEVELAND, O.

**Address, TAYLOR MFG. CO.**
*(Please Mention this Paper.)* Chambersburg, Pa.

## Blue Grass Route of Ohio

### TIME TABLE.

In effect July 16, 1883.

**The Cleveland, Mt. Vernon and Delaware RAILROAD.**

GEO. D. WALKER, RECEIVER.

SOUTH-BOUND TRAINS.

| | Mail. | Expr'ss. | Acc'm | Acc'm |
|---|---|---|---|---|
| Leave. | | | | |
| Cleveland | 8 25 am | 2 30 pm | 3 45pm | ..... |
| Hudson | 9 40 | 3 35 | 5 00 | ..... |
| Cuyahoga F's. | 9 58 | 3 53 | 5 24 | ..... |
| Akron | 10 14 | 4 08 | 5 40 | ..... |
| Clinton | 10 45 | 4 44 | 6 11 | ..... |
| Warwick | 10 50 | 4 49 | 6 16 | ..... |
| Orrville | 11 14 | 5 15 | 6 40 | ..... |
| Fredricksburg | 11 45 | 5 46 | 7 13 | a. m. |
| Millersburg | 12 08 pm | 6 08 | 7 35 ar | 5 25 |
| Gann | 15 55 | 6 58 | ..... | 6 15 |
| Danville | 1 07 | 7 09 | ..... | 6 26 |
| Gambier | 1 27 | 7 29 | ..... | 6 46 |
| Mt. Vernon | 1 55 D | 7 54 | ..... | 7 15 B |
| Centerburg | 2 26 | 8 27 | ..... | 7 50 |
| Westerville | 2 10 | 9 10 | ..... | 8 38 |
| Columbus arr. | 3 35 | 9 35 | ..... | 9 05 |

NORTH-BOUND TRAINS

| STATIONS. | Expr'ss. | Mail. | Acc'm | Acc'm |
|---|---|---|---|---|
| Leave | | | | |
| Columbus | 7 10 am | 12 10 pm | ..... | 5 20 pm |
| Westerville | 7 35 | 12 34 | ..... | 5 48 |
| Centerburg | 8 17 | 1 16 | ..... | 6 33 |
| Mt. Vernon | 9 02 B | 2 00 D | ..... | 7 19 S |
| Gambier | 9 14 | 2 11 | ..... | 7 29 |
| Danville | 9 34 | 2 29 | ..... | 7 49 |
| Gann | 9 46 | 2 40 | ..... | 8 01 |
| Millersburg | 10 38 | 3 27 | 5 45am | 8 50 arr |
| Fredricksb'g | 11 00 | 3 47 | 6 06 | ..... |
| Orrville | 11 33 | 4 17 | 7 10 B | ..... |
| Warwick | 11 56 | 4 39 | 7 37 | ..... |
| Clinton | 12 02 pm | 4 44 | 7 46 | ..... |
| Akron | 12 35 | 5 14 | 8 20 | ..... |
| C'yahoga F's | 12 50 | 5 26 | 8 33 | ..... |
| Hudson | 1 10 | 5 43 | 8 53 | ..... |
| Ar. Clevel'd | 2 25 | 6 55 | 10 10 | ..... |

B Breakfast. D Dinner. S Supper.

N. MONSARRAT, Gen'l Supt. Akron, O
E. T. AFFLECK, General Passenger Ag't, Columbus, O.

## THE NICKEL PLATE.

**New York, Chicago & St. Louis Railroad.**

The passenger equipment of this new trunk line is all new and is supplied with the latest appliances necessary to safe, speedy and comfortable travel.

At Chicago, Passenger Trains arrive at and leave Union Depot, Van Buren street.

Following is the time in effect May 14, 1883, and until further notice:

GOING EAST.

| | Local Pass'n'gr | Local Pass'ngr. | Con'eaut Accom. |
|---|---|---|---|
| Lv. Chicago | 8 15 am | ..... | ..... |
| Ar. Valparaiso | 10 05 | ..... | ..... |
| " Ft. Wayne | 1 30 pm | ..... | ..... |
| " New Haven | 2 05 | ..... | ..... |
| " West Leipsic | 4 09 | ..... | ..... |
| " Arcadia | 5 10 | ..... | ..... |
| " Fostoria | 5 25 | ..... | ..... |
| " Gr. Springs | 6 12 | ..... | ..... |
| " Bellevue | 6 40 | ..... | ..... |
| Lv Bellevue | 6 55 | 8 30 am | ..... |
| Ar Cleveland | 9 20 pm | 10 55 | ..... |
| Lv Cleveland | ..... | 11 00 | 5 00 pm |
| Ar Painesville | ..... | 12 06 pm | 6 15 |
| " Ashtabula | ..... | 12 58 | 7 11 |
| " Conneaut | ..... | 1 25 | 7 40 |
| " Erie | ..... | 2 28 | ..... |
| " Dunkirk | ..... | 4 21 | ..... |
| " Buffalo | ..... | 6 00 | ..... |

GOING WEST.

| | Local Passn'gr. | Local Pass'ngr. | Con'eaut Accom. |
|---|---|---|---|
| Lv Buffalo | 10 15 am | ..... | ..... |
| Ar Dunkirk | 11 56 | ..... | ..... |
| " Erie | 1 35 pm | ..... | Leave. |
| " Conneaut | 2 53 | ..... | 6 10 ar |
| " Ashtabula | 3 25 | ..... | 6 39 |
| " Painesville | 4 19 | ..... | 7 36 |
| " Cleveland | 5 25 | ..... | 8 50 |
| Lv Cleveland | 5 30 | 7 15 am | ..... |
| Ar Bellevue | 7 55 | 9 30 | ..... |
| Lv Bellevue | ..... | 9 40 | ..... |
| Ar Gr. Springs | ..... | 10 07 | ..... |
| " Fostoria | ..... | 10 46 | ..... |
| " Arcadia | ..... | 11 00 | ..... |
| " West Leipsic | ..... | 11 58 | ..... |
| " New Haven | ..... | 2 05 pm | ..... |
| " Ft Wayne | ..... | 2 20 | ..... |
| " Valparaiso | ..... | 6 25 | ..... |
| " Chicago | ..... | 8 20 | ..... |

### FOR ROCKY RIVER.

Commencing Sunday, June 17, 1883, trains between Cleveland and Rocky River, (on Sundays only), will run as follows:

WESTWARD.

Leave Cleveland—(Broadway Station)
8 15 a.m; 9 50 a.m; 12 50 p.m; 4 10 p.m; 7 00 pm.
Pearl Street—
8 23 am; 9 58 am; 12 58 pm; 4 18 p m; 7 08 pm.
Lorain Street—
8 30 am; 10 05 am; 1 05 pm; 4 25 pm; 7 15 am.
Arrive River Bank—
8 55 am; 10 30 am; 1 35 pm; 4 50 pm; 7 40 pm.

EASTWARD.

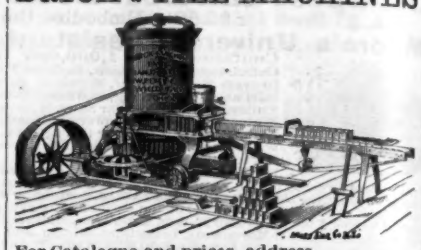
Leave River Bank—
9 00 am; 12 00 noon; 3 20 pm; 6 00 pm; 8 20 pm.
Arrive at Cleveland (Lorain Street—
9 25 am; 12 25 pm; 3 45 pm; 6 25 pm; 8 45 pm.
Pearl Street—
9 32 am; 12 32 pm; 3 52 pm; 6 32 pm; 8 52 pm.
Broadway Station—
9 40 am; 12 40 pm; 4 00 pm; 6 40 pm; 9 00 pm.

Trains run by Columbus time, which is twenty minutes faster than Chicago, five minutes slower than Cleveland, and sixteen minutes slower than Buffalo time.

For information, call on nearest Agent of the Company or address

B. F. HORNER, Gen'l Passenger Agent,
LEWIS WILLIAMS, General Manager, Cleveland, O.

## BRICK and TILE MACHINES

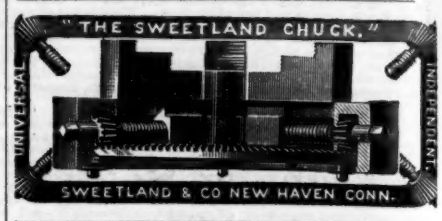


For Catalogue and prices, address

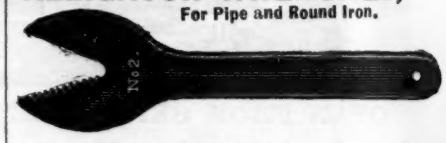
**J. W. PENFIELD,**
**Willoughby, Ohio.**

Mention this paper. 81

**REST** not, life is sweeping by, go and dare before you die, something mighty and sublime leave behind to conquer time." $66 a week in your own town. $5 outfit free. No risk. Everything new. Capital not required. We will furnish you everything. Many are making fortunes. Ladies make as much as men, and boys and girls make great pay. Reader, if you want business at which you can make great pay all the time, write for particulars to H. HALLETT & Co., Portland, Maine.



**ALLIGATOR WRENCHES,**
For Pipe and Round Iron.




S. A. SMITH,
154 Lake Street, Chicago.
Agent for the Western States. 82

ASK FOR

**DIXON'S**

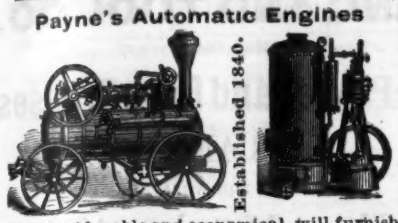
AMERICAN

**Graphite Pencils**

S—Soft.
S M—Soft Medium.
M—Medium.
H—Hard.
V H—Very Hard.

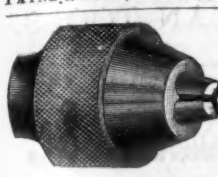
JOS. DIXON CRUCIBLE CO.
Jersey City, N. J.

**Payne's Automatic Engines**



Established 1840.

Reliable, durable and economical, will furnish a horse power with ¼ less fuel and water than any other engine built, not fitted with an automatic cut-off. Send for illustrated Catalogue No. 20 for information and prices. B. W. PAYNE & SONS, Box 1436, Corning, N. Y.



**ALMOND DRILL CHUCK.**

Sold at all Machinists' Supply Stores.

**T. R. Almond,**

84 Pearl street, 8

BROOKLYN, N. Y

**THE HOTCHKISS MECHANICAL BOILER CLEANER**

AN AUTOMATIC DEVICE

FOR REMOVING MUD

AND

**Preventing Scale**

AND FOAMING.

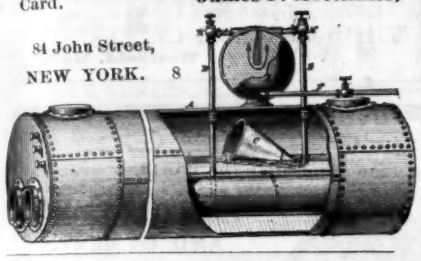
Patented 1875.

Simplest, Best and Cheapest. "How to Keep Boilers Clean," a 72-page book, sent free to any address, on sending your name on a Postal Card.

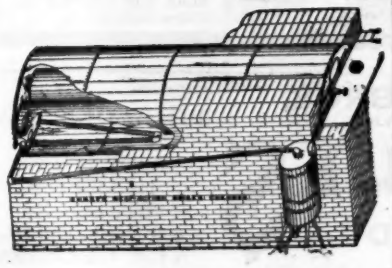
**James F. Hotchkiss,**

84 John Street,

NEW YORK. 8



**Sharp's**



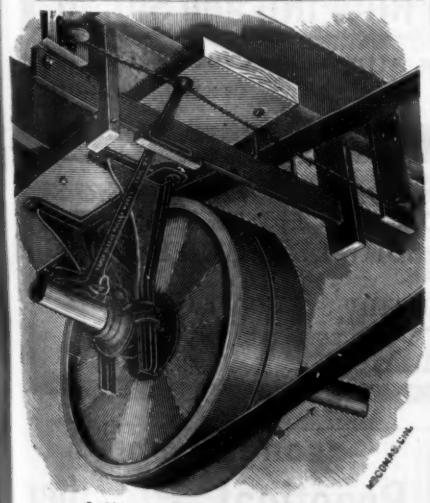
**Self-Acting Boiler Cleaner,**

Warranted in Every Respect.

**Thos. Sharp & Co.,**

**Salem, O.**

Send for Circulars and Price List. Mention this Paper. 74



**Adjustable Dead Pulleys.**

**Taper Sleeve Pulley Works,**

MANUFACTURERS of Taper-Sleeve Wood Belt Pulleys, Taper Sleeve and Compression Couplings, Adjustable Dead Pulleys, Wood Pulleys, Split or made in Halves, Friction Clutch Pulleys, and Friction Clutch Couplings. You can start a load with this clutch, at any speed, with ease and safety.

ERIE, PA.

**Cleveland Foundry.**

**CASTINGS**

For Machinery and Rolling Mills.

**Car Wheels**

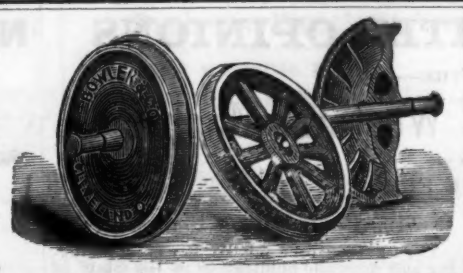
all sizes and kinds, with and without Axles.

**Chilled Faced R. R. Frogs.**

STREET RAILROAD TURNOUT.

Nos. 9, 11, and 13 Winter Street.

**BOWLER & CO.**

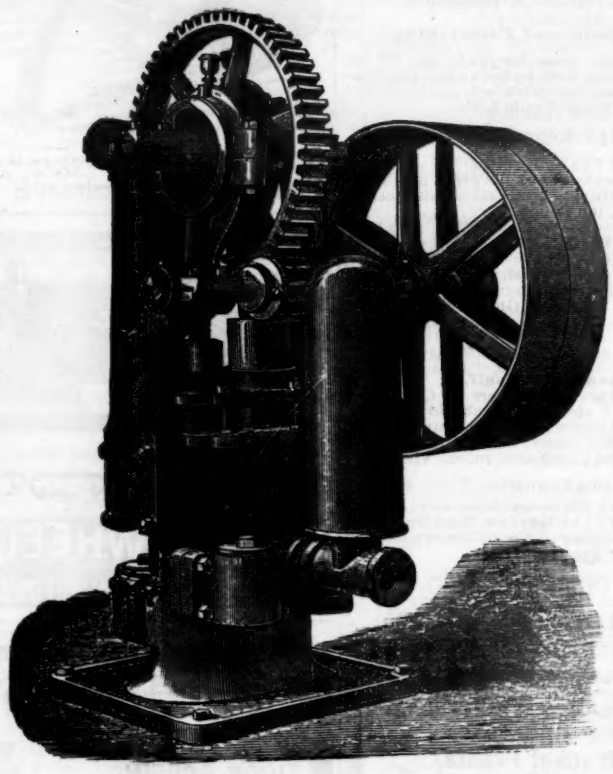


THE ECONOMIC

**Patent Boiler Feed Pump**

**Arthur Kirtland, Agt.,**

Office—No. 7 South Water Street, CLEVELAND, O.



Davis's Patent, May, 1876.

Capt. C. Hinsdale:

The Double Acting No. 1 Pump we bought of you, manufactured by I. B. Davis & Son, Hartford, Conn., gives splendid satisfaction, working smooth and even, "no noise," and free from thump or jar, supplying all the water we want. Would not exchange it for the best steam pump made. Our engineer endorses the above and thinks it the most perfect machine in the works. We anticipate no trouble from it in the least.

Respectfully,

BUCHER, GIBBS & CO.

per Gibbs.

Bucher, Gibbs & Co., Canton, Ohio, Dec. 9, 1880.

**INTERCHANGEABLE IN ALL ITS WORKING PARTS. GEARED 5 TO 1.**

I. B. DAVIS & SON, MAKERS, HARTFORD, CONN.

**CLIMAX COOK**

**Specially Designed for the Western Market.**

OVEN NO. 8—20x21½x13 Inches. OVEN NO. 9—22x23½x14 Inches.

Has peculiar and important features that make it the best operating stove in the market, and commend it to the favorable notice of dealers who desire a first class stove.

It is constructed with our patent flue, which descends in the rear and ascends in front between oven and fire-box, forming a wide flue around back, bottom and front of oven, insuring an easy draft and uniform heating of all parts of oven.

The Reservoir is of planished copper, with deep, stamped pit, protected with cast iron, and is effectually heated without an extra damper. By removing Reservoir and supplying its place with cover plates, a complete six-hole stove is obtained

The fire-back is in three heavy interchangeable pieces. A water-back is provided which occupies the same space as fire-back, heats perfectly and does not retard the heating of oven, for reasons of the intervening flue between it and oven.

The grate is hinged at its extreme back edge, and when dumped gives a clear opening into a large ash-pan. It can be partially dropped to remove clinkers from the front.

A receptacle for the covers, when removed from top of stove, is hung on swing bracket under front hearth.

Its neat design, nicely polished edges, nickeled panel plates and trimmings, give it a very attractive appearance.

Send for prices. ——MANUFACTURED BY——

**Taplin, Rice & Co.,**

AKRON, OHIO. 1

**CUNARD LINE,**

(Established 1840.)

**LANE ROUTE.**

Royal Mail Steamers between Liverpool, Boston, and New York, calling at Cork Harbor.

**Two Sailing Every Week.**

AURANIA, CEPHALONIA, MARATHON
ATLAS, CATALONIA, PALMIRA,
SERVIA, BOTHNIA, PAVONIA,
PARTHIA, SCYTHIA, GALLIA,
BATAVIA, SAMANA, MALTA.

From New York every Wednesday; from Boston every Saturday. Rates of passage $80 and $100, according to accommodation. Return tickets on favorable terms. Steerage passengers booked to and from all parts of Europe at low rates. VERNON H. BROWN & CO.

72 4 Bowling Green, New York.

**CEO. C. TRACY & CO.**

**Patent Law**

AND SOLICITING OF PATENTS.

Blackstone Building,

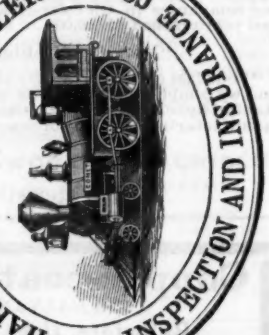
71 CLEVELAND, O.

816 F Street, Washington, D. C.

Send for 140 page instruction book.

J. M. Allen, Pres. Wm. B. Franklin, V. Pres
J. B. Pierce, Sec'y.

HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.



**GEO. P. BURWELL, Gen. Agent,**

246 Superior Street,

CLEVELAND, O.

**A. C. CETCHELL,**

9 Chief Inspector.

F. I. FREEMAN, Prop. JAS. GILLETT, Mangr.

THE

**Ætna Machine Works,**

Manufacturers of

High and Low Speed

**Stationary Engines**

BOTH

UPRIGHT AND HORIZONTAL

Geared and Direct Attachment

**CIRCULAR SAW MILLS.**

STEAM PUMPS,

**IRON AND BRASS CASTINGS.**

Patent Sets and Head Blocks for Saw Mills, and Machinery of all descriptions. I now have the agency for the celebrated

**Watertown Portable Engines & Boilers,**

and can supply customers with anything in this line at very low prices.

Call at Works and see them in Stock.

Also manufacturers of

**The Ætna Engines.**

These are an entirely new style of Upright Engines, designed by F. I. Freeman, and

**PATENT APPLIED FOR.**

They are so constructed that they can be sold for one-half the price for the ordinary style of the same sizes or power, consequently they are by far the

**Cheapest Engines in the Market**

And are warranted satisfactory in every respect. They are designed especially for Saw Mills, Grist Mills and Hoisting Machines, and are high or low speed engines, running from one to seven hundred revolutions per minute; are strong and heavily built, of the best material and workmanship.

☞ Parties interested will find one in operation at the works. Call and examine for yourselves. Sizes range from eight to one hundred horse power.

Also dealers in Gas and Pipe Fittings, Globe Valves, and

**Second-hand Machinery of all kinds**

**Prompt Attention given to Repair Work.**

☞ Parties wishing to buy or sell second-hand Machinery will do well to call.

Corner Vernon and Hudson Streets,

(Opposite N. Y. P. & O Freight Depot.,

WARREN OHIO.

## SOME UNSOLICITED OPINIONS

—OF THE—

## Trade Review and Western Machinist

**FROM THE PRESS:**

**"One of the Best."**

One of the best papers of its class.—Springfield, O., Republic.

**"An Able Exponent."**

The REVIEW is an able exponent of the industries of Ohio.—Chicago Industrial World.

**"Rapidly Obtaining a Reputation."**

This publication is rapidly obtaining a reputable place in the journalism of mechanism.—Detroit Marine News.

**"Improves With Every Number."**

The Cleveland TRADE REVIEW improves with every number.—Akron News.

**"Established Reputation."**

The TRADE REVIEW has already an established reputation, and under the management of the new and aggressive owners, will become one of the best trade papers of the country.—St. Louis Age of Steel.

**"Very Efficient."**

The REVIEW has long been recognized as a very efficient organ of the manufacturing interests of Northern Ohio, and we have no doubt that its new proprietors will extend its usefulness and expand its field of operation.—Philadelphia Bulletin.

**"Entitled to a Large Patronage."**

The REVIEW is the only strictly manufacturing and scientific publication in the State of Ohio, and is entitled to a large patronage.—Meadville, Pa., Republican.

**"One of the Ablest and Most Interesting."**

The Cleveland TRADE REVIEW is one of the ablest and most interesting of trade papers, and shows renewed vigor and enterprise with every number.—Pittsburgh Telegraph.

**"Conscientious and Painstaking."**

The REVIEW has been for years one of the most conscientious and painstaking publications in our somewhat extended circle of exchanges.—Cincinnati Trade List.

**"A Worthy Representative."**

The Cleveland TRADE REVIEW * * * is a worthy representative of the great mechanical and manufacturing interests of this section.—Akron, Ohio, City Times.

**"Well Edited."**

The paper is well edited, and is the only strictly manufacturing, industrial and scientific publication issued in Ohio.—New Castle, Pa., Guardian.

**FROM PATRONS:**

**"A First-Rate Paper."**

"We think you are making a first-rate paper," writes one of the largest manufacturing companies in Cleveland, whose business last year reached $2 000,000.

**"Very Creditable."**

"Your last edition is a very creditable one, and we compliment you on its neat and substantial appearance." So writes a prominent manufacturing company of Seneca Falls, N.Y.

**Speaks for Itself.**

"We have sold seven elevators in Cleveland in the short time since we began advertising in the TRADE REVIEW," was the unsolicited testimonial of a Rochester, N. Y., firm to a representative of this paper on a recent visit.

**"More Inquiries."**

"We have more inquiries from our advertisement in the TRADE REVIEW than from any other," said a member of a well-known manufacturing firm of Titusville, Pa.

**Day & Carter,** Proprietors,

122 Water street, (Board of Trade Building), Cleveland, O.

## Copper-coated Spun Zinc Ornaments

FOR GALVANIZED IRON CORNICE MANUFACTURERS.

**Balusters, Urns, Finials, Sign Mortars, Bracket Fronts, Half and Whole Balls, etc.**

Send detail Drawings by mail or express, at our expense, for estimates.

ALFRED F. SMITH, Salem, O.

W. Worswick, Pres. E. Lewis, Vice-Pres. John A. Prindle, Sec. & Treas.

## WORSWICK MANUFACTURING CO.,

Corner Merwin and Center Streets, Cleveland, Ohio.

STEAM FITTERS, MACHINISTS AND BRASS FOUNDERS.

Manufacturers of, and Dealers in

**Plumbers', Gas and Steam Fitters' Supplies.**

Sole Manufacturers of the 64

WORSWICK PATENT RADIATORS

## Leetonia Tool Co.

**Leetonia, O.**

Manufacturers of

## Axes, Picks

**Mattocks, Sledges, &c.**

Send for Catalogue and prices to the trade. 71

***The IRWIN & REBER***

PATENT

**Expanding Water Conductor**

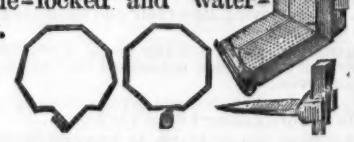
MANUFACTURED BY THE

**S. S. S. Conductor Co.**

LIMITED,

**47 Federal St., Allegheny, Pa.**

THE STANDING SEAM allows of an easy and secure fastening, keeping the pipe far enough from the wall to make any overflow from the eave pipe or head, run down the spout, and not the wall; and will open, in case of freezing, so as to prevent bursting, and still remain double-locked and water-tight.



**PRINCIPAL AGENTS.**

E. B. Badger & Son, Boston, Mass.; Noyes & Wines, New York; J. S. Thorn, Philadelphia; John G. Hetzell, Baltimore, Md.; R. P. Gormully, Chicago; F. Schmidt & Sons, Milwaukee; Shackelton Bros., Cleveland; Patterson & Hayes, Erie, Pa.; G. H. Peters & Son, Buffalo, N. N.; James Ackroyd, Albany, N. Y.; Witt & Brown, Cincinnati,; Hull & Cozzens, Mnfg Co., St. Louis, Mo., and many others.

## NIAGARA STAMPING AND TOOL CO.

Manufacturers of

**Power and Foot Presses**

DIES AND TOOLS

FOR WORKING

**Sheet Metal and Wire**

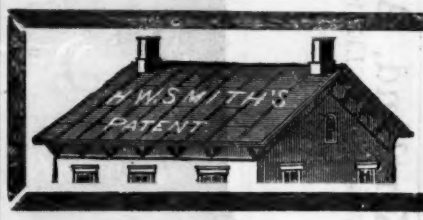
—o—

FRUIT CAN TOOLS.

**Squaring Shears, &c.**

Nos. 147 and 149 Elm street, BUFFALO, N. Y.

Mention this paper. 23




**Iron Roofing,**

CHEAPEST AND BEST IN USE, AND

**BEST IRON PAINT**

for new or old buildings, of all kinds.

Manufactured by

T. C. SNYDER & CO.,

CANTON, OHIO.

Send for circular and price list.

An agent wanted in every town. 1

## CORUNDUM WHEELS.

**EMERY WHEELS** WILL RUN WET OR DRY

Polishers' and Machinists' Supplies, Rub Stones, Emery Wheels, Machinery, and Diamond Tools. Send for Circulars to

Vitrified Wheel Co.,

21 Westfield, Mass.

## Garry Iron Roofing Co.

**The Largest Manufacturers of Iron Roofing in the World.**

Manufacturers of all kinds of

**IRON ROOFING**

CRIMPED AND CORRUGATED SIDING,

Iron Tile or Shingles, Fire-Proof Doors, Shutters, etc.

**IRON ORE PAINT AND CEMENT.**

152 to 158 MERWIN ST., CLEVELAND, O.

Send for Circular and Price List No. 85. 8

Railroad Track Scales.

The Best in the World.

**RIEHLE BROS.**

STANDARD

## SCALES AND Testing Machines.

PHILADELPHIA, 50 South 4th st.
NEW YORK, 115 Liberty st.
ST. LOUIS, 609 North Third st.
NEW ORLEANS, 142 Gravier st.

Iron Shingles, Double Cap, Corrugated, Crimped, Bead.

**MOSER & THOMPSON,**

Manufacturers of

**IRON ROOFING and SIDING.**

Send for Circular and Price List No. 35.

28-32 River Street, CLEVELAND, OHIO.

## BODIFIELD & ARNETT,

**AGENTS FOR P. JEWELL & SON'S LEATHER BELTING,**

—AND—

Cleveland Rubber Company's Rubber Goods,

No. 8, South Water street, Cleveland, O.

MACHINERY FOR

**Straightening and Cutting Wire**

Of all Sizes to any Length.

Send for Catalogue.

JOHN ADT,

New Haven, Conn. U. S. A. 92

**GEORGE S. PAINE,**

## Practical Plumber

AND GAS FITTER.

Plumbing materials of all descriptions kept constantly on hand.

362 Superior street, CLEVELAND, O.

Telephone No. 866. 14

## Cleveland Business Directory.

**Assayers and Analytical Chemists.**

JUDSON, W, E, Ana ytical Chemist, 31 8 Cushing Block.

**Bolt and Nut Works.**

HOTCHKISS & UPSON MANUFACTURING CO. Manuf'rs. Machine, Plow & Elevator Bolts, Coach Screws. 15

**Boiler Makers.**

SMITH & TEACHOUT—(Established 1857.) Boiler, Tanks, Stills etc. 644 Broadway.

**Bridge and Boiler Builders.**

BUCKEYE BRIDGE AND BOILER WORKS, mfrs of Arch & Truss Bridges, Boiler Tanks and Oil Stills. Bet. Wasson St. and Case Ave.

**Coal, Iron and Ore.**

ANDREWS, HITCHCOCK & CO., Briar Hill, Coal and Pig Iron. 122 Water Street. 81

JACKSON IRON CO. Iron Ore and Pig Iron. Fayette Brown, Gen. Agent. 101 St. Clair street. 15

RHODES & CO. Coal, Iron Ore and Pig Iron. 101 St. Clair street. 1

DALLIBA, J. H., Iron Ore. Grand Arcade Building, 101 St Clair st. 51

**Carriage Bolts.**

THE COLWELL & COLLINS NORWAY BOLT CO., manufacturers of Philadelphia Carriage and Tire Bolts. 41

**Church and School Furniture.**

FAULHABER, GEO. manufacturer of School and Church Furniture. Fine Hard Wood work a specialty. Cor. Jennings and Scranton Avenues. 23

**Carriage Repository.**

GREENE'S, J. O., Carriage Repository, 408 Superior street and 52, 54 & 56 Rockwell street, dealer in Fine Carriages. Repair shop in connection. 41

**Dyers.**

BICHLMYER, A., 122 Seneca st. Gentlemen's and Ladies' Clothes Cleaned and Dyed. 74

**File and Saw Works.**

PARKIN, W. H. & CO., Hand-cut Files and Rasps, dealers in Disston's saws. No. 11 South Water street. 51

**Foundries.**

BOWLER & CO., Car Wheels, Patent Chilled Frogs, and all kinds of castings. 9 Winter.

CLEVELAND MALLEABLE IRON CO., manufacturers Malleable Iron Castins. 74

LAKE SHORE FOUNDRY, Water and Gas Pipe, Light and Heavy Castings. Alabama st. 61

TAYLOR & BOGGIS, successors to H. & H. F. Taylor, Iron Founders, 65 to 73 Central Way. 53

FITZSIMONS WM. & SON, Rolling Mill and Machinery castings. Rolls a Specialty. No. 435 Broadway. 64

**Hides, Pelts and Leather.**

DENNISON BROS., dealers in Hides, Pelts, Furs and Tallow, 48 and 50 River street. 33

**Hardwood Lumber.**

MARTIN, J. T. dealer in Hardwood Lumber, Stone's Levee, near Central Way 51

**Hardware and Iron.**

BINGHAM, WM. & CO., Hardware, Iron, Nails and Metals, 148 and 150 Water street.

CLEVELAND ROLLING MILL CO., manufacturers of Steel and Iron Wire and Steel Tire. 34

**Lumber.**

WOODS, PERRY & CO., manufacturers and dealers in Lumber, Lath, etc., 5 Carter st. 4

FISHER, WILSON & CO., wholesale lumber dealers (pine & hard wood), rough and dressed umber, timber, lath, shingles, etc. 47 Central Way. 82

KRAUSE, C. A., & SON, wholesale and retail dealers in lumber. Yards cor. Superior and Wason and 281 Merwin streets. 04

**Lime Manufacturers.**

RUSSELL LIME CO., manufacturers of White Lime; also dealers in Plaster, Cement, etc. 85 Elm street. 34

**Machinery and Boilers.**

KRITCH, K. E. Metal Pattern Maker. Small machinery repaired. Lawn Mower sharpening a specialty. 42 South Water Street. 71

**Mercantile Agency.**

THE MERCANTILE AGENCY. R. G. Dun & Co. proprietors. 121 Superior street.

**Oil Manufacturers.**

AMERICAN LUBRICATING OIL CO. manf'rs of lubricating oils, 23 Euclid ave, 84

## Cleveland Business Directory.

**Stair Builder.**

PFEIL, CHAS, Stair Builder; Hard Wood Mantles and Office Railing. Works, 49 & 51 Canal street, Cleveland, Ohio. 41

**Steel Stamps and Stencils.**

FLEHARTY, J. H. & CO., Rubber Stamps, Seals, Stencils. 197 Superior street. 54

**Steam Furnaces.**

CUYAHOGA STEAM FURNACE CO., Manfrs of Land and Marine Engines, Machinery for Blast Furnaces, Rolling Mills, Bessemer Steel Works, &c. Mill-Gearing and all kinds of Castings, Foundry, Machine and Boiler Shops. 53

**Trunks and Valices.**

FABER, J. manuf. Trunk, Traveling Bags and Ladies' Fine Satchels. Sample trunks and Cases a Specialty. 56 Public Square 54

**Vessel Agents.**

WEBB, H. J. & CO., Ship Brokers and Vessel agents. 17 & 18 Board of Trade Building. 122 Water Street. 72

## Business Directory.

**Akron, O.**

AKRON IRON CO., manufacture best Common, Refined and Charcoal Iron.

MCNEIL, J. C., Steam Boilers, Heavy Sheet Iron Work. Repairing promptly executed.

TAPLIN, RICE & CO., manuf'rs. of Stoves and Hollow Ware, dealers in Tinners' Stock, etc. 04

WEBSTER, CAMP & LANE MACHINE CO., Founders and Machinists, 12 Main street. 84

CAHOW BROS. manfrs. of and dealers in Wood and Metal Pumps, Pipe, etc. 225 West Market street. 42

MAY & FIEBEGER, Galvanized Iron Cornices. Send your plans for estimates. 62

**Alliance, O.**

MCFARLAND, J. W. Engine and Machine Builder, and General Machine Jobbing, 41

**Buffalo, N. Y.**

SANDS, PAUL, Marine and Stationary Steam Engine Works mfr. of drilling machines, foot & power lathes, 70 Columbia st. 33

EMPIRE STATE MF'G CO., O. F. Swift, prop'r, manfr of Fluters, Sad Irons, Spun Copper & Half Copper Tea Kettles. Washington, cor. Ohio. 83

WHITE, L. & I, J. manf'r's of Coopers' Tools. Carpenters' Tools, and Ship Tools. Also manf'r's of Planer Knives and Machine Cutters to order. 310-314 Exchange street. 32

THE BUFFALO NUT AND BOLT CO.—[Limited.] Manufrs. of Hot Pressed Nuts, Bolts, Washers, Rivets, &c. 226 Ohio St. 31

**Bridgeport, Ct.**

ATLANTIC HOTEL, directly opposite the Railroad Depot. D. Foland, proprietor. W. Foland, H. W. Terrell, Clerks; Wm. Richardson, Night Clerk. 2

**Canton, O.**

NOVELTY IRON WORKS, Mill work, Shafting, engines, Imperial job printing press, etc. 73

BELDEN BURNER CO.—H. S. Belden—B. C. Goodrill. 158 and 160 S. Market-st., Manfrs of gasoline burners and fixtures, and contractors for lighting streets. 2

THE SUN VAPOR LIGHT & STOVE CO., manufacturers of Vapor Gas Lights, Gasoline Stoves and Tinner's Soldering Furnaces. Contractors for lighting the streets of cities and towns. No. 116 E. 5th Street. 72

**Columbus, O.**

REYNOLDS BROS., manufact'rs of hand-cut Files and Rasps. Old files re-cut. Send for Price List. 11

CITY BOILER WORKS, manfrs of Stationary, Portable and Locomotive Steam Boilers. All work warranted. Borger Bros. & Co. 03

MURRAY, HAYDEN & CO., manfrs of Malleable Iron. Cor. Randolph & West streets. 13

**Cuyahoga Falls, O.**

SNYDER, H. wholesale manufacturer of Sash, Doors, Blinds, &c. Send for Price Lists. 71

THE CUYAHOGA FORGE AND IRON CO. manfrs. of every description Car, Truck & Driving Axles, Forging, Shafting. 71

**Cincinnati, O.**

THE CINCINNATI STEAM HEATING CO. mfrs, dealers and contractors. Warming and Ventilation of public and private buildings a specialty. Boilers, Radiation, Pipe, Fittings, Brass Goods, &c. Correspondence solicited. 187 West Pearl street. 92

**Erie, Pa.**

BALL ENGINE CO., manufacturers of Automatic Engines of 15 to 60 horse power.

**Geneva, O.**

THE ENTERPRISE MACHINE CO., L. L. Crane, Pres't, manfrs of Machinists' Tools and Machinery. Gear Cutting a specialty. 8

**Lima, O.**

LIMA HOUSE, centrally located; telegraph office in the house. J. Goldsmith, Prop.

## Business Directory.

**Meadville, Pa.**

CURRY & CO. general jobbers in Castings of all kinds. 43

**Niles, O.**

REEVES Bros., Manufacturers of Boiler, Tank and Sheet Iron work, etc. 64

**Olean, N. Y.**

MYRICK BROS. & CO., manufact'rs Engines and Boilers, oil drilling tools, rig irons, etc. 72

**Oil City, Pa.**

REID, JOS. Machinist, steam engine and pump repairing. Brass and iron castings, light and heavy, made on short notice. 2

**Pittsburgh, Pa.**

PRINTING PRESSES. W. A. Bunting, manufacturers' agent. Printers supplies, type, cards. 42½ Sixth Street. [Up stairs.] 17

**Painesville, O.**

NORTH AMERICAN CUTLERY CO., manufacturers of Steel Shears and Scissors—best quality. 8

**Ravenna, O.**

THOMPSON, T. F., dealer in Agricultural Implements, farm machinery, hardware, seeds, fertilizers, &c. Cor. Main and Prospect streets. 51

**Rochester, N. Y.**

GOWE, JNO. N., mfrs. of Specialties, such as Machine forging, bridge bolts and trusses, railroad switches, spike, mall, chisels, &c. 23

WOOD-WORKING MACHINERY. Send for Catalogue. J. S. Graham & Co. 43

**Sandy Lake, Pa.**

EBERMANN, W. S. & SONS, manfrs. of the celebrated Ebermann Boiler Feeder. Send for Circulars and Price List. 2

**Toledo, O.**

BAKER, HERBERT, Machine Shop and Iron Foundry. 98 and 100 Erie street. 71

TOLEDO FOUNDRY AND MACHINE CO builders of Steam Engines, Circular Saw Mills and all kinds machinery. Water St., cor. Cherry. 03

RUSSELL IRON WORKS, mnfrs. of Architectural Iron Work, castings, pulleys, shafting and steam bending machinery. Corner Water and Lagrange streets. 84

STANDARD SAW WORKS, H. Bartley, manufacturer and dealer in Saws of every description. All kinds of Springs made from Sheet Steel. Reaper, Hay Knives Truss, Springs, &c. made to order. 92 St. Clair St. 3

UNION Manufacturing Co., manufacture Sewing Machines, Wash-boards, Children's Wagons, Carts, Wheelbarrows, Sleds, Kitchen Wooden ware, &c. 3

BOAT BUILDING: Hepburn Bros., prop. Union Boat Works. Boats of all kinds made to order. For sale or rent. Water Street, foot of Cherry. 3

**Wheeling, W. Va.**

EXCELSIOR MACHINE WORKS, Redman & Co., general machinists and manufacturers of Marine and Stationary Engines, Hangers, Pullies, Shafting, &c. Cor. 18th & Chapline streets. 12

**Youngstown, O.**

BELL, EDWIN & SONS, manuf. of Nail Kegs, Pat. coiled hoops, slack barrel and keg heading and oil barrel stock. 1

DINGLEDY, G. H. dealer in rough and dressed Lumber, Shingles and Lath. 1

**Brattleboro', Vt,**

A JOY FOREVER!

ESTEY ORGANS

Manufactured by

J. ESTEY & CO.,

Brattleboro', Vt.

02 (Catalogue free on application.)

$72 A week made at home by the industrious. Best business now before the public. Capital not needed. We will start you. Men, women, boys and girls wanted everywhere to work for us. Now is the time. You can work in spare time, or give your whole time to the business. No other business will pay you nearly as well. No one can fail to make enormous pay, by engaging at once. Costly outfit and terms free. Money make fast, easily, and honorably. Address TRUE & CO., Augusta, Maine.

WILLIAM WHITE,

Manufacturer of

Boilers & Gas Holders,

TELESCOPE AND SINGLE GAS HOLDERS,

Wrought and Cast Iron Tanks.

Orders solicited. Write for Estimates.

NEW CASTLE, PA.

SAFETY STEAM, WATER & HAND POWER ELEVATORS.

GIVE HATCH SIZE, ELEVATION OF BUILDING, & SEND FOR ILLUSTRATED CIRCULAR.

C. H. MITCHELL & CO.

105 MICHIGAN ST CHICAGO

To Owners of Patent Articles

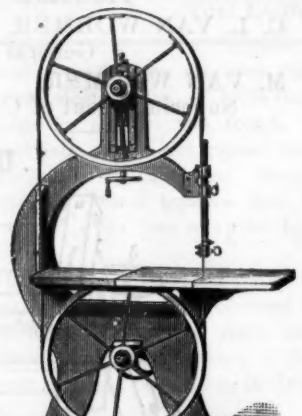
AND SPECIALTIES.

HAVING recently added new tools I am better prepared to contract for the manufacture of specialties, such as Gasoline or Oil Burners, Torches, Cutting and Threading Iron or Brass Pipe, Bolts, &c., by automatic machinery. Making special Taps, Reamers and Gears; Turret Lathes, Speed Lathes, Slide Rests. Sole manufacturer of Culver's Patent Automatic Cast Steel Bolt Cutter Head. Correspondence solicited.

JAMES AITCHISON, Machinist,

81 52 Canal Street, Cleveland, O.

Eureka Band Saw.



We build three sizes of this machine

with 26, 30 and 38 inch wheels.

The two smaller sizes will saw hard wood 12 in. thick, the largest 16 in. thick. They are made of the best material and are well made.

For further information address

FRANK & CO.,

Manufacturers of

WOOD WORKING MACHINERY,

176 Terrace Street, BUFFALO N. Y.

FOR SALE, a fine piece of property on Jennings Avenue, of 500 feet, near the Nickel Plate Railroad. Well located for building or manufacturing purposes. We will sell this at a bargain, and invite a call.

A. D. MORTON & SON.

326 Euclid Avenue, Room 6. 10 tf

FOR SALE.—A first class medium CIRCULAR SAW MILL, new, never been used. Will be sold cheap. Address M. & Co., care Trade Review. 51-tf

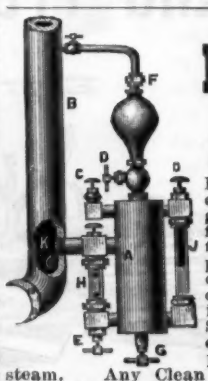
WANTED—A position as SALESMAN by a gentleman who fully understands machinery. Address, F. H. D., care Trade Review. 51-tf

WANTED.

WANTED, a good mechanic in every machine shop and foundry to get up clubs for both the Weekly and Monthly TRADE REVIEW AND WESTERN MACHINIST. We give the best rates to clubs, and pay better commissions to those who get them up than any other journal published. For particulars or specimen copies address

DAY & CARTER, Publishers,

122 Water Street, Cleveland, O.




THE DETROIT

Lubricator Co.'s

SIGHT FEED

LUBRICATOR CUPS.

For oiling valves and cylinders of steam engines, by the only perr fect method, through the steam pipe. The oil passes in sight, drop by drop, into the column of steam where it vaporizes, thus becoming a STEAM LUBRICANT, oiling perfectly every part reached by the steam. Any Clean Oil, black or white, light or heavy, may be used. Saves from 50 to 90 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on twenty days' trial if desired. In ordering give diameter of cylinder.

NOTICE.

The first lubricators ever made, showing the oil passing drop by drop through a transparant water chamber, were devised by us, and the same are fully embraced by many Letters Patent owned and controlled by us, which have been sustained in several hotly contested legal contests. Our customers, therefore, need have NO FEARS in their purchase and use. We are the sole owners of the "Sight Feed" feature as claimed by us, and we shall hold purchasers and users responsible who are encroaching upon our rights by the unlawful use of our device.

DETROIT LUBRICATOR CO.

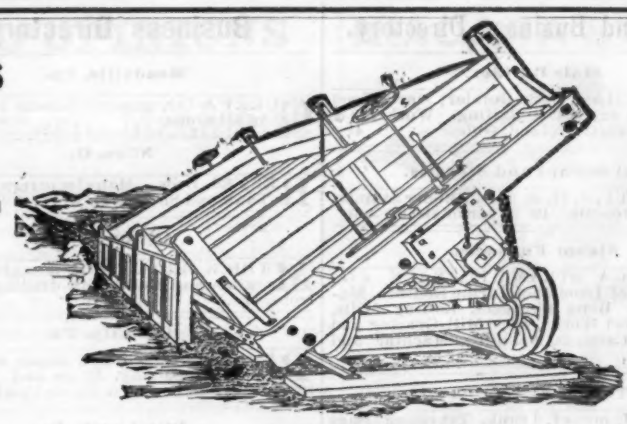
Office 98 Griswold street, Detroit, Mich.

Note—In our recent suit against the American Lubricator Co., of Detroit, before Justice Stanley Matthews, of the U. S. Supreme Court, involving their "Sight Feed" feature, a decree was rendered in our favor August 20, 1881. (Mention this paper.)

☞ WM. BINGHAM & CO., Sole Agents for this territory.

THE
**United States Car Co.'s**
SCREW LEVER
# Dump and Coal Car.
(M. VAN WORMER'S PATENTS.)

A. P. JAQUES,
President.
C. L. VAN WORMER,
General Manager.
M. VAN WORMER,
Superintendent of Construction.


PERSPECTIVE VIEW.

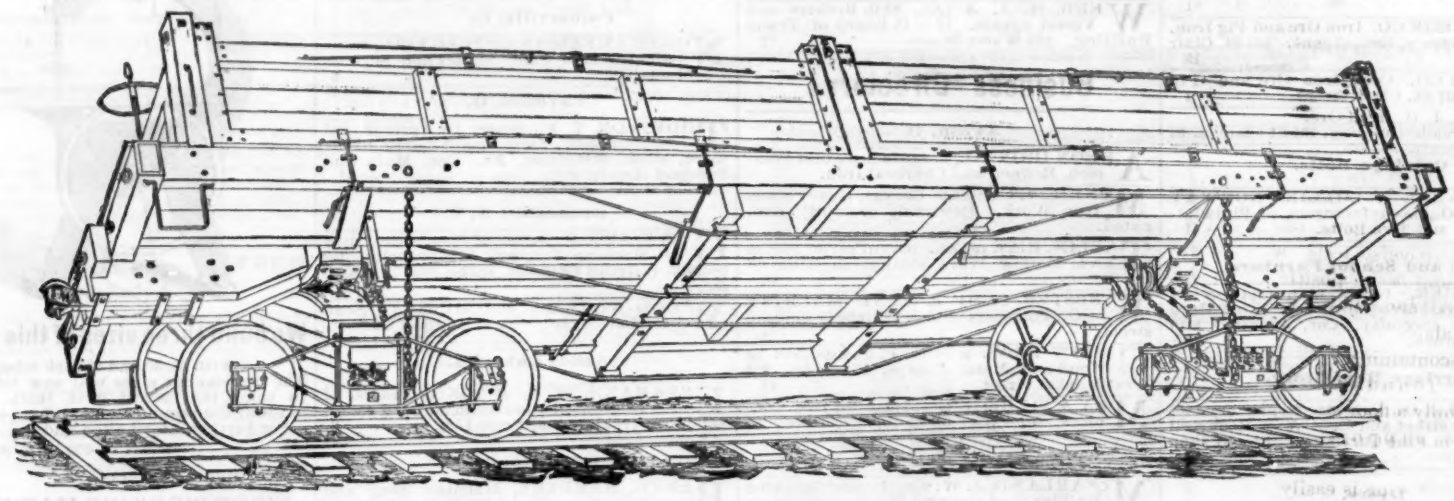
This Car has a Capacity of
**18 to 20 Tons**
AND CAN BE HANDLED BY ONE MAN,
**DISCHARGING ITS LOAD INSTANTLY.**

The device can be applied to flat and grain cars. The car is under perfect control at all times, and can be held at any elevation or dumped suddenly if desired. For construction trains, cars with this device would be invaluable

*The Mechanism is Strong, Simple and Durable*

The following Railroads and Car Builders are building cars with this Screw Lever attachment, viz: Clifton and Southern Pacific Railway, Kansas City, Mo.; Wilmington & Northern Railway, Wilmington, Del.; Northern Pacific Railroad Co.; Boston & Maine R.R. Co.; Gill Car Manfg. Co., Columbus, O.; Lehigh Valley Railroad; Gilbert Car Mfg. Co., Troy, N.Y.; Wells & French Car Co., Chicago; Rock Island and Mercer County Railroad; Maine Central Railroad Co.: Pontiac & Pacific Railway, Canada; Cleveland Rolling Mills Co., Cleveland; Ontario Car Co., London, Ontario, Canada; Billmeyer & Small Co., York, Pa.; Litchfield Car and Machine Co., Litchfield, Ills.; N. Y., P & O. Railway Co., Cleveland, Ohio.

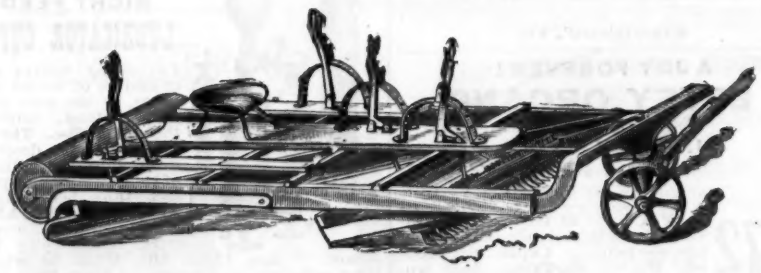
**UNITED STATES CAR CO., 48 CONGRESS ST., BOSTON, MASS.** 61


UNDERSIDE VIEW.

**LEETONIA BOILER WORKS CO.**
Manufacturers of All Kinds of
Boilers, Blast Furnace Stacks, Oil Tanks, Plate and
**SHEET IRON WORK.**
Prompt Attention Given to Repairing.
**Leetonia, Ohio.** 74

Established 1841.] THE MERCANTILE AGENCY. [94 Branch Offices.
R. G. DUN & COMPANY, Proprietors.
This establishment supplies (to subscribers only) all necessary information as to the standing, responsibility, etc., of merchants, traders, manufacturers, public companies, etc., through the United States, their Territories and British North America. Also, makes collections and attends to legal business generally. It is the oldest and by far the most complete and extensive system ever organized for the accommodation of banking and mercantile interests and for the general promotion and protection of trade. Reference books published quarterly. Cleveland Office—Rooms 4 and 5, No. 121 Superior-st. Terms of subscription made known on application. R. P. CATTRALL, Manager. 2

**The Griffin Road Machine Co.**
MANUFACTURERS OF
# Road and Track Machines,
Elyria, O.



CITY SURVEYOR'S OFFICE,
LANSING, MICH., May 3, 1883.
The Griffin Road Machine Co.
Gents.--We have had your machine running for a month, and are highly pleased with it. It has already more than paid for itself by the saving of labor.
H. D. BARTHOLOMEW,
City Surveyor.
22

**Cleveland Iron Ore Paint Co.**
Manufacturers of
**PURE IRON ORE PAINTS.**
Red (Rossie) and Purple. We guarantee all our Paints, and respectfully solicit the patronage of consumers and dealers. Our Paints are used largely by the R. R's and Car Builders of our country. Send for price list No. 5.
Office 154 Merwin St., Cleveland, Ohio.
**BEST IRON PAINT.**

**A. F. CUSHMAN**
MANUFACTURER OF
**CHUCKS**
HARTFORD. CONN. U.S.A.
All sizes, Independent, 4-Jaw Combination Universal Geared and Lever. Brass Finishers' 2-Jaw, from 4 in. to 9 in. Chucks for Cutting-off Lathes Screw Machines, Amateur Lathes. Centering and Drill Chucks. 9
SEND FOR CATALOGUE.

# STEEL CASTINGS
FROM 1-4 TO 15,000 LBS. WEIGHT. TRUE TO PATTERN, sound and solid, superior in strength, toughness and durability to iron forgings in any position, or for any service whatever. Gearing of all kinds, Shoes, Dies, Hammerheads, Crossheads, Rockers and Piston Heads for Locomotives, etc. 15,000 Crank Shafts and 10,000 Gear Wheels of this Steel now running prove its superiority over other Steel Castings. CRANK SHAFTS, CROSSHEADS & GEARING SPECIALTIES. Castings of Every Description. Circulars and Price Lists free. Address, 91
**CHESTER STEEL CASTINGS CO.,**
Works, Chester, Pa. 407 Library St., Philadelphia.

**Iron Clad Paint Co.,**
Factory 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g
**Cleveland, Ohio.**

Trade Mark Patented—Paint Patented

Order direct from the
**Iron Clad Paint Co.,**
And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green and now owned by this Company.
**IRON CLAD PAINT is the most durable, most fire-proof, and CHEAPEST PAINT MADE.**
**Furnished both Dry and Ground in Oil.**
**Used by nearly all the Railroads.** 63

**PCKANDS, MATHER & CO.,**
**IRON ORE AND PIG IRON,**
GRAND ARCADE BUILDING,
St. Clair Street,
CLEVELAND, O. 61

**KEYSTONE SCREW CO.,**
17th and Venango Streets,
PHILADELPHIA.
**J. BILLERBECK,**
Manufacturer of 22
**Iron Gimlet-Pointed Wood Screws.**
Ask for discounts.

## Improved Joint
FOR GLASS, ETC.,
FOR ROOFING HOT-BEDS,
GREENHOUSES, ETC.
**Applicable to Vertical or Inclined Surfaces, with thick glass, slate or tile,**
Making the Roof Impervious to Water, Dust, Cold or Snow.
Call on or Address WM. WARD,
827 Broadway,
Or E. W. Palmer, Cleveland Window Glass Co., 130-134 Champlain Street, Cleveland, O. 91